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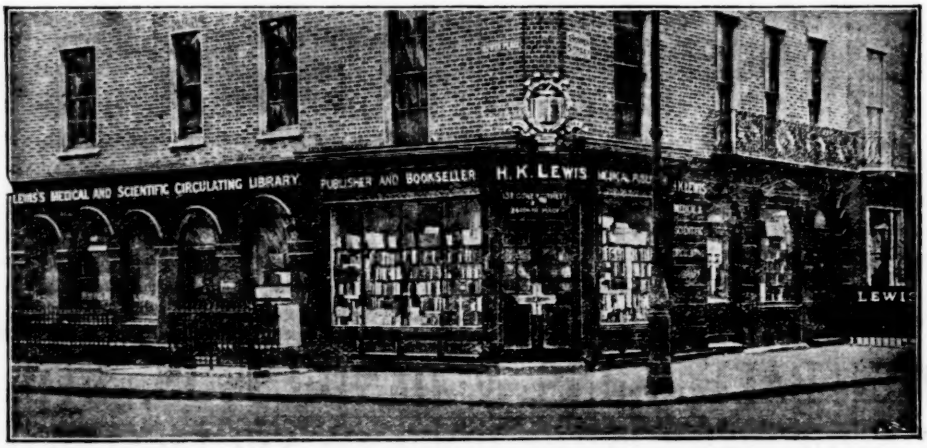

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THE IMPORTANCE OF THIS MEASUREMENT AS A GUIDE TO PHYSICAL FITNESS UNDER DIFFERENT CONDITIONS AND IN DIFFERENT CLASSES OF INDIVIDUALS.[1]

BY GEORGES DREYER, M.A., M.D.,
PROFESSOR OF PATHOLOGY, UNIVERSITY OF OXFORD.

(*From the Department of Pathology, University of Oxford.*)

DURING the last few years questions relating to the vital capacity of man have acquired prominent importance, since this measurement has been a decisive factor in the selection or exclusion of candidates for our Flying Service. A definite minimum standard of "vital capacity" was fixed, more or less arbitrarily, for the admission of cadets to the Royal Air Force, and standards were also decided upon for the grading of flying officers for different types of service. In laying down rules in this connexion, the question of the size of the man was entirely disregarded as though of no consequence, and the standards were arrived at simply as the result of examining a number of successful pilots, and determining their average vital capacity.

PIONEER WORK OF JOHN HUTCHINSON.

Justification for this arbitrary course was possibly found in the fact that no definite relationship between vital capacity and size was believed to exist, and that vital capacity was regarded as an extremely variable measure in different individuals, although the question of its relation to size had been approached in the remarkable and fundamental work of John Hutchinson as long ago as 1846. He claimed that vital capacity increases in a simple arithmetical progression with increasing height, and believed that he had disproved the existence of any definite relationship between vital capacity and either body weight, stem length, or chest measurement.

Although his work stands out as a pioneer achievement by one who realised, as none before or since has done, the vast importance and wide scope of the problem which he attacked, and forms a model of careful and accurate observation and measurement, yet, as will be shown in this paper, his mathematical analysis of his results failed to reveal the true relationship which vital capacity bears to certain other body measurements. The conclusions at which he arrives are as follows:—

1. That there exists a definite relationship between *standing height* and vital capacity, and he lays down the rule "that for every inch of height (from 5 ft. to 6 ft.) 8 additional cubic inches of air at 60° are given out by a forced expiration."
2. That, as regards the influence of *weight* on vital capacity, the vital capacity increases from the 7 st. men to the 12 st. men, and then becomes more or less irregular. Further, that it may be said that the vital capacity increases nearly in the ratio of 1 cubic inch per pound from 105 lb. to 155 lb., and that from 155 lb. to 200 lb. this increase is overpowered, and there is a loss of 39·5 cubic inches as the effect of weight.
3. That, in relation to *circumference of chest*, "contrary to what I ever expected, and agreeable to the opinion of others, I do not find there exists any direct relationship between the circumference of the chest and the vital capacity." And he concludes, having analysed his tables: "Hence the absolute breadth of chest is not a direct, ready guide to estimating the vital capacity."

In referring to these remarkable observations of Hutchinson, one cannot but express the greatest admiration for the scientific manner in which they are collected. The fact that the conclusions which I, drawing upon his material as well as my own, have reached in regard to vital capacity and various body measurements differ from his on practically every single point, cannot affect my profound admiration for this quite unusual piece of pioneer work—an admiration to which I cannot better testify than by quoting the fine sentences with which he ends his exhaustive and excellent treatise on the Respiratory Functions:—

"The matter of this communication is founded upon a vast number of facts—immutable truths, which are infinitely beyond my comprehension. The deductions, however, which I have ventured to draw therefrom, I wish to advance with modesty, because Time, with its mutations, may so unfold Science as to crush these deductions, and demonstrate them as unsound.

Nevertheless, the facts themselves can never alter, nor deviate in their bearing upon respiration—one of the most important functions in the animal economy."

THE AUTHOR'S RESULTS.

Before entering into detailed discussion of my results, it would be well to state here that the result of my investigations has enabled me to establish definite relationships between vital capacity and body surface, body weight, stem length and chest measurement, and to show that vital capacity is *not* a simple function of height, as Hutchinson claimed. In order of importance the relations are as follows:—

1. The vital capacity is a function of the *weight*. This can be expressed in the formula $\frac{W^n}{V.C.} = K_1$ where W is the net weight of the body expressed in grammes, V.C. the vital capacity expressed in cubic centimetres, and the power n is approximately $\frac{2}{3}$, though more accurately 0·72, and K_1 is a constant. As it is already established that $\frac{W^n}{S} = K_2$ where W = net weight, S = body surface, and the power n is approximately $\frac{2}{3}$ though more accurately 0·72, it follows that *the vital capacity is a simple function of the body surface*. In other words, that the smaller and lighter individual, with his relatively larger surface, has a greater vital capacity per unit of body weight than the larger individual.
2. The relation between the vital capacity and *stem length* can correctly be expressed by the formula $\frac{\lambda^n}{V.C.} = K_3$ where λ = stem length in centimetres, V.C. = vital capacity in cubic centimetres, the power n is approximately 2, and K_3 is a constant.
3. The relation between vital capacity and *circumference of chest* can be expressed by the formula $\frac{Ch.^n}{V.C.} = K_4$ where Ch. = circumference of chest expressed in centimetres, V.C. = vital capacity expressed in cubic centimetres, the power n is approximately 2, and K_4 is a constant.
4. Finally, $\frac{\lambda \times Ch.}{V.C.} = K_5$ where λ = stem length in centimetres, Ch. = circumference of chest in centimetres, V.C. = the vital capacity in cubic centimetres, and K_5 is a constant.

I shall now proceed to prove the existence of the above-mentioned relationships. In order to do so I will deal first with my own observations and subsequently with those of Hutchinson and other observers.

THE AUTHOR'S OBSERVATIONS.

The data given in the following tables was obtained from 16 men and boys who were carefully selected on account of their physical fitness, and covered as widely different a range in weight, height, &c., as possible.

The weight varied from 29·8 kg. to 88·8 kg.; the standing height from 140 cm. to 186 cm.; the stem length from 71·5 cm. to 98·5 cm.; the circumference of chest from 67·5 cm. to 96·1 cm., and the vital capacity ranged from about 2300 c.cm. in the lightest to about 5100 c.cm. in the heaviest individual. The ages ranged from 13 to about 52 years.

In this paper all measures are expressed in grammes, centimetres, and cubic centimetres unless otherwise stated. The weight is net weight, without clothing; the standing height in stockinged feet is taken in the usual manner; the circumference of chest was measured by tape measure placed directly on the skin round the chest just on the nipple line. While being measured the subject was made to stand

[1] An abstract of this paper was read to the delegates at the Convegno Sanitario Interalleato d' Aeronautica, Rome, Feb. 15th 1919.

with his arms hanging loosely down at his sides, breathing normally. This method of measurement was chosen because it was found to yield more regular results for comparison than measurements taken during extreme inspiration and expiration. The subject should be encouraged to talk whilst being measured, as the muscles are then more or less perfectly relaxed. The stem length was obtained by seating the subject on the floor or a board, with his back against a perpendicular triangular projection, to which the scale is fixed. To secure accurate measurement it is necessary for him to place his hands on the floor or board, close to his body, and, drawing up his knees, to raise himself for a moment and press his os sacrum as close as possible against the scale. It will be found that different persons bend the knees to different degrees when attempting to achieve this result. In such a position a constant measurement of stem length is provided from the top of the head to the ischial tuberosities, and one that does not vary in repeated measurements of the same individual. On account of the influence of the muscles the stem length taken when the subject is seated on a chair does not afford a constant measure of an individual, nor a measure which lends itself to accurate comparison of one individual with another—a point to which Walker has also drawn attention. The measurements taken by this latter method have been found to be about 3 per cent. greater than those obtained by the methods used in this paper.

For the measurements of vital capacity a spirometer of the dry type, made by Boullite, of Paris, was selected, as it offers a minimum resistance to expiration. The measurements were taken while the subject was sitting on a high stool with his back straight. He was always first shown carefully how to proceed, and then five measurements were taken. The subject was kept in ignorance of the readings while being examined, as it was found that any such knowledge tended to interfere with the accuracy of the results. The highest reading of the five measurements is the figure recorded in the tables. In a large number of observations the highest reading was found to be about 5 per cent. greater than the mean of the five observations. The measures are all reduced to room temperature (15° C.) and 760 mm. pressure.

In Table I. are given the details of the 16 persons as regards age, weight, standing height, stem length, circumference of chest, and vital capacity. It is seen from this

TABLE I.

(A) Body weight (g.).
(B) Standing height (cm.).
(C) "Stem length" (cm.).
(D) Circumference of chest (cm.).
(E) Vital capacity (c.cm).

No.	Age.	(A)	(B)	(C)	(D)	(E)	No.	Age.	(A)	(B)	(C)	(D)	(E)
16	12 1/2	29,800	140·0	71·5	67.5	2330	9	25	63,500	171·0	88·0	85·2	4160
15	13 5/12	38,900	156·0	74·0	73·3	2840	11	22	66,900	179·6	91·0	86·0	4400
14	14 5/12	41,200	150·0	77·5	76·7	3030	5	43 5/12	69,100	164·2	86·0	91·3	4400
10	28 3/12	56,300	160·5	87·0	87 4	3830	3	31 7/12	74,600	184·5	95·2	93·2	4660
13	18 1/12	58,600	168·8	88·5	79·6	3300	7	35 5/12	77,400	172·5	91·5	96·4	4800
4	27 1/12	63,500	172·0	85·0	88·8	4200	8	25	81,000	184·0	95·4	92·2	4890
6	31 3/12	63,500	171·0	90·2	92·2	4200	12	24	81,100	178·0	90·0	95·2	5140
	35 1/12	63,500	172 0	92·0	85·2	4440	1	51 1/2	88,800	186·0	98·5	96·1	5130

g., grammes. cm., centimetres. c.cm., cubic centimetres.

table that there is an almost steady increase of vital capacity with increasing weight, while this regularity is but poorly maintained with increase in standing height.

The Relation between Vital Capacity, Body Surface, and Body Weight.

In attempting to find the best mathematical expression for the relationship between body weight and vital capacity it was found that the body weight to the *n*th power, divided by the vital capacity, gives a constant, and it will be further seen that the power n is approximately ⅔, though more accurately 0·72. But since it has already been shown that $\frac{W^n}{S} = K$ where W = net weight in grammes, S. = surface in square centimetres, and the power n is approximately ⅔, but more accurately 0·72. it follows that *the vital capacity is a simple function of the body surface.*

In Table II. is calculated the "vital capacity constant" from the formula $K = \frac{W^{0.72}}{V.C.}$ as well as the vital capacity expressed in percentage of the body weight in grammes. In comparing these two columns it is obvious that there is an almost regular decrease in the percentage of vital capacity

TABLE II.

(A) Body weight (g.).
(B) Vital capacity observed (c.cm.).
(C) Vital capacity constant: $K = \frac{W^{0.72}}{V.C.}$
(D) Vital capacity calculated: $V.C. = \frac{W^{0.72}}{0·690}$.
(E) Difference between vital capacity calculated and observed (per cent.).
(F) Vital capacity as percentage of body weight.
(G) Vital capacity calculated as per cent. (6·626) of body weight.
(H) Difference between vital capacity calculated and observed (per cent.).

No.	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
16	29,800	2330	0 714	2410	3·32	7·819	1975	17 97
15	38,900	2840	0 710	2922	2·81	7 301	2577	10·21
14	41,200	3030	0·693	3044	0·46	7 354	2730	10·99
10	56,300	3830	0·688	3812	0·47	6·802	3730	2·68
13	58,600	3800	0·712	3822	3·11	6·485	3883	2·14
4	63,500	4200	0 683	4160	0·96	6·614	4207	0·17
6	63,500	4200	0 683	4160	0·96	6 614	4207	0·17
2	63,500	444)	0·646	4160	6·73	6·992	4207	5 54
9	63,500	4160	0·693	4160	0·00	6·552	4207	1·12
11	66,900	4400	0·677	4315	1·97	6·577	4433	0·74
5	69,100	4400	0 693	4419	0·43	6 368	4578	3·89
3	74,600	4660	0·691	4668	0·17	6·247	4943	5·73
7	77,400	4800	0·689	4793	0·15	6·202	5130	6·43
8	81,000	4890	0·699	4954	1·29	6·037	5367	8·89
12	81,100	5140	0·666	4958	3·67	6·338	5374	4·35
1	88,800	5130	0·713	5295	3·08	5·777	5884	12·62
	Average ...	...	0·690	...	1·85	6 626	...	5·87

as the individuals increase in weight, while the "vital capacity constant" does not show any periodical change with the increase in weight, the variations only being such as depend on slight individual differences. It is further seen that the mean vital capacity constant is 0·69 and that the average figure representing the vital capacity as a percentage of the body weight is 6·626.

In the same table is also calculated the vital capacity from the formula $V.C. = \frac{W^{0.72}}{0·69}$ (i.e., as a function of the surface), and from the average vital capacity percentage, 6·626, as well as the percentage differences between the observed figures and those calculated under the two procedures. In the first case the greatest individual deviations of the observed from the calculated figures are + 6·73 per cent. and − 3·32 per cent., while the average deviation is only 1·85 per cent. If, on the other hand, the vital capacity is calculated as a percentage of the body weight, the greatest individual deviations become as much as + 12·82 per cent. and − 17·97 per cent., the average deviation being 5·87 per cent., or about three times as large as in the former case. From this there is no doubt that the formula expressing the vital capacity as a function of the body surface represents the experimental data in a highly satisfactory manner, while the same data cannot rightly be expressed in percentage of body weight.

In Table III. the observations are arranged in eight groups, by grouping together the individuals of approximately the same weight and averaging their vital capacity. The vital capacity constant and the vital capacity expressed as percentage of the body weight are then calculated. It is again seen that the percentage of vital capacity decreases with almost absolute regularity from 7 819 per cent. in the lightest group to 5·77 per cent. in the heaviest group, while the vital capacity constant shows no periodic deviation.

In the same table are calculated the vital capacity as a function of the surface, and also as a simple function of the weight. In the former case the percentage deviation is only 1·57, while in the latter it is 5·23, taking into consideration the number of individuals in each group, or more than three

times as great. It is obvious that the greater the range of weight covered by the observations the greater must be the difference in the results arrived at by the two methods of calculation.

If, instead of making use of the best value for n (0·72) in the formula one uses, for the sake of convenience, the power ⅔, the average K for the 16 observations is 0·380, and

TABLE III.

(A) Numbers from Table I. forming groups.
(B) Number in group.
(C) Average body weight (g.).
(D) Average vital capacity observed (c.cm.)
(E) Vital capacity constant: $K = \frac{W^{0.72}}{V.C.}$
(F) Vital capacity calculated: $V.C. = \frac{W^{0.72}}{0.691}$.
(G) Difference between vital capacity calculated and observed (per cent.).
(H) Vital capacity as percentage of body weight.
(I) Vital capacity calculated as per cent. (6·643) of body weight.
(J) Difference between vital capacity calculated and observed (per cent.).

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
16	1	29,800	2330	0·714	2407	3·20	7·819	1979	17·74
15,14	2	40,050	2335	0·702	2981	1·54	7·329	2690	9·11
10,13	2	57,450	3815	0 700	3867	1·34	6·640	3816	0·03
4, 6, 2, 9	4	63,500	4250	0·676	4156	2·26	6·693	4218	0·76
11, 5	2	68,000	4400	0·685	4363	0·85	6·471	4517	2·59
3, 7	2	76,000	4730	0·691	4730	0·00	6·223	5049	6·32
8, 12	2	81,000	5015	0·682	4952	1·27	6·188	5384	6 85
1	1	88 800	5130	0·713	5285	2·93	5·777	5898	13·02
		Average		0·691	...	1·57	6·643	...	5·23

the percentage difference between observation and calculation increases from 1·58 in the case of the best n (0 72) to 2·46, taking n as ⅔. Whenever a great range of weight is covered by the observations it becomes imperative to make use of the best n (0·72) in the formula, while this is of less importance when only a relatively small range of weight is covered.

In Table IV. are calculated my own observations on vital capacity, according to Hutchinson's idea that it increases in a simple arithmetical progression with increasing height. By applying this method it was ascertained that the best approximation to be found was that for each 1 cm. increase in height there is an increase of 65 c.cm. in vital capacity. In this table the greatest individual differences between the calculated and observed figures are seen to be + 15·39 per cent. and − 13·42 per cent., while the average difference between calculation and observation is 6·02 per cent.—more than three times greater than the deviation found if the vital capacity be calculated as a function of the body surface by means of the formula $V.C. = \frac{W^{0.72}}{K}$, where the percentage deviation is found to be as little as 1·85.

It is further of interest to note that if the vital capacity be calculated as a simple function of the height the percentage deviation is even larger than if the vital capacity be calculated as a simple function of the body weight—a procedure which has already been proven to be entirely fallacious.

Both from this table and from Table I. it will also appear that *the vital capacity of man is not* (as claimed by Hutchinson) *a simple function of the height*, since it does not increase at a fixed rate with each unit increase in height, but irregularly, and in the following manner. From a certain point the rate of increment of vital capacity per unit increase of height at first quickens, but presently a maximum is reached at a certain body height, and thereafter the rate of increment of vital capacity diminishes for a period before it again increases.

The Relation between Vital Capacity and Stem Length.

In Table V. the 16 observations are arranged according to their stem length. It is seen that, with increase in stem length there is also a more or less regular increase in vital capacity, though the regularity is very much less pronounced than was the case when the same observations were arranged by weight. The mathematical relationship between stem length and vital capacity was found to be $\frac{\lambda^n}{V.C.} = K$ where the power n is approximately 2. In Table V. this constant is calculated, as well as that of the vital capacity from the formula $V.C. = \frac{\lambda^2}{1\,9}$. Looking at the column where the constants are given it will be found that, though they exhibit considerable individual variations, there is no evidence of periodicity. By applying the formula it

TABLE IV.

(A) Standing height (cm.).
(B) Vital capacity observed (c.cm.).
(C) Vital capacity calculated from height (Hutchinson's method).
(D) Difference between vital capacity calculated and observed (per cent.).

No.	(A)	(B)	(C)	(D)
16	140·0	2330	2240	4·02
14	150·0	3030	2890	4·84
15	156·0	2840	3280	15·42
10	160·5	3830	3702	3·46
5	164·2	4400	3813	15·39
13	168·8	3800	4092	7·14
6	171·0	4200	4255	1·29
9	171·0	4160	4255	2·23
4	172·0	4260	4320	2·78
2	172·0	4440	4320	1·39
7	172·5	4800	4352	10 29
12	178·0	5140	4710	9·13
11	179·6	4400	4814	8 60
8	184·0	4390	5100	4·12
3	184·5	4660	5132	9 20
1	186·0	5130	5230	1·91
		Average ...		6·02

TABLE V.

(A) Stem length (λ) (cm.).
(B) Vital capacity observed (c.cm.)
(C) Constant: $K = \frac{\lambda^2}{V.C.}$
(D) Vital capacity calculated: $V.C. = \frac{\lambda^2}{1\,9}$
(E) Difference between vital capacity calculated and observed (per cent.).

No.	(A)	(B)	(C)	(D)	(E)
16	71·5	2330	2·20	2690	13·38
15	74·0	2840	1 83	2880	1·39
14	77·5	3030	1 98	3160	4·11
4	85·0	4200	1·72	3810	10·24
5	86·0	4400	1·68	3900	12·82
10	87·0	3830	1·98	3990	4·01
9	88·0	4160	1·86	4080	1 96
13	88·5	3800	2 06	4125	7·85
12	90·0	5140	1·58	4280	20·09
6	90·2	4200	1·94	4282	1·92
11	91·0	4400	1 98	4370	0·69
7	91·5	4800	1·75	4420	8·60
2	92·0	4440	1·91	4460	0·45
3	95 2	4660	1·95	4780	2·51
8	95·4	4890	1·86	4800	1·88
1	98·5	5130	1·89	5115	0·29
		Average ...	1·90	...	5·76

is made clear that there is an average percentage deviation of observation from calculation of 5·76. This percentage deviation is nearly three times as great as in the case where the vital capacity is calculated as a function of the surface, and only slightly smaller than if it be calculated as a simple function of the weight. Such a considerable percentage deviation of observation from calculation is caused by the fact that the stem length in individuals of the same weight varies considerably. That this interpretation is true becomes patent when we arrange the observations in five groups according to their stem lengths and average their vital capacities, as done in Table VI. In this case the percentage deviation of observation from calculation of the vital capacity, using the formula $V.C. = \frac{\lambda^2}{1\,9}$, is only 3·54, while the percentage deviation found if the vital capacity be calculated as a simple function of the body weight hardly diminishes by grouping but remains more or less unchanged.

If we consider for a moment the significance of this relationship which has been found to exist between stem length and vital capacity, it is easy to demonstrate that it is entirely rational and must exist in view of the relationship which has been shown to hold between weight and stem length. The same considerations will make it clear that there exists no definite relationship between standing height and vital capacity.

In an unpublished analysis which I made nearly ten years ago of a number of existing observations of standing height and body weight in man I found it was impossible to demonstrate any simple regular relationship between these two measurements. On the other hand, in different animals a definite relationship between stem length and weight was to be traced. This relationship could be expressed by the formula $\frac{W^n}{\lambda} = K$ and the power n is approximately equal to ⅓. It was therefore probable by analogy that a similar relationship between stem length and weight would exist in

man. This point was cleared up, at my suggestion, by Dr. Ainley Walker. The results of his investigations have already been published, and proof given that the relationships between stem length and body weight can be expressed by the same formula in animals and man, and that the formula $\frac{W^n}{\lambda} = K$, where the power n is approximately $\frac{1}{3}$, holds good.

As we have just seen that $\frac{W^{\frac{2}{3}}}{V.C.} = K$, and also that $\frac{W^{\frac{1}{3}}}{\lambda} = K$, it follows directly that $\frac{\lambda^2}{V.C.} = K$, which exactly represents the formula which was deduced from the experimental data.

TABLE VI.

(A) Numbers from Table I. forming groups.
(B) Number in group.
(C) Average stem length.
(D) Average vital capacity observed (c.cm.).
(E) Vital capacity calculated: $V.C. = \frac{\lambda^2}{1{\cdot}90}$
(F) Difference between vital capacity calculated and observed (per cent.).

(A)	(B	(C)	(D)	(E)	(F)
16, 15, 14	3	74·3	2733	2910	6·08
4, 5, 10	3	86·0	4143	3900	6·23
9, 13, 12, 6	4	89·2	4325	4200	2·98
11, 7, 2	3	91·5	4413	4405	0·18
3, 8, 1	3	96·4	4890	4900	0·20
		Average			3·12

TABLE VIII.

(A) Numbers from Table I. forming groups.
(B) Number in group.
(C) Average circumference of chest (cm.).
(D) Average vital capacity observed (c.cm.).
(E) Vital capacity calculated: $V.C. = \frac{Ch^2}{1{\cdot}82}$
(F) Difference between vital capacity calculated and observed (per cent.).

(A)	(B)	(C)	(D)	(E)	(F)
16, 15, 14	3	72·5	2733	2890	5·43
13, 2, 9	3	83·3	4253	3815	11·48
11, 10, 4, 5	4	88·4	4208	4300	2·14
6, 8, 3	3	92·5	4583	4700	2·49
12, 1, 7	3	95·9	5023	5050	0·54
		Average... ...			4·27

In examining the relationship between the circumference of the chest and the vital capacity during normal breathing it was found that this relationship could be expressed by the formula $\frac{Ch.^n}{V.C.} = K$, and the power n was again found to be approximately 2.

TABLE VII.

(A) Circumference of chest (Ch.) (cm.).
(B) Vital capacity observed (c.cm.).
(C) Constant: $K = \frac{Ch.^2}{V.C.}$
(D) Vital capacity calculated $V.C. = \frac{Ch.^2}{1{\cdot}82}$.
(E) Difference between vital capacity calculated and observed (per cent.).

No.	(A)	(B)	(C)	(D)	(E)
16	67·5	2330	1·96	2505	6·99
15	73·3	2840	1·89	2955	3·89
14	76·7	3030	1·94	3240	6·48
13	79·6	3800	1·67	3495	8·73
2	85·2	4440	1·64	3995	11·14
9	85·2	4160	1·74	3995	4·13
11	86·0	4400	1·68	4070	8·11
10	87·4	3830	1·99	4200	8·81
4	88·8	4200	1·88	4340	3·23
5	91·3	4400	1·89	4595	4·24
6	92·2	4200	2·02	4680	10·26
8	92·2	4890	1·74	4680	4·49
3	93·2	4660	1·86	4780	2·51
12	95·2	5140	1·76	4990	3·01
1	96·1	5130	1·80	5090	0·79
7	96·4	4800	1·94	5110	6·07
	Average ...		1·84	...	5·80

TABLE IX.

(A) Body weight (g.).
(B) Circumference of chest (cm.).
(C) Constant: $K = \frac{W^{\frac{1}{3}}}{Ch.}$
(D) Circumference of chest calculated: $Ch. = \frac{W^{\frac{1}{3}}}{0{\cdot}457}$.
(E) Difference between circumference of chest calculated and observed (per cent.).

No.	(A)	(B)	(C)	(D)	(E)
16	29,800	67·5	0·459	67·8	0·44
15	38,900	73·3	0·462	74·1	1·08
14	41,200	76·7	0·450	75·5	1·59
13	56,300	87·4	0·438	83·8	4·30
10	58,600	79·6	0·488	84·9	6·24
4	63,500	88·8	0·449	87·2	1·83
6	63,500	92·2	0·432	87·2	5·73
2	63,500	85·2	0·468	87·2	2·29
9	63,500	85·2	0·468	87·2	2·29
11	66,900	86·0	0·472	88·8	3·15
5	69,100	91·3	0·449	89·8	1·67
3	74,600	93·2	0·451	92·1	1·19
7	77,400	96·4	0·442	93·2	3·43
8	81,000	92·2	0·469	94·6	4·65
12	81,100	95·2	0·454	94·7	0·53
1	88,800	96·1	0·464	97·6	1·54
	Average ...		0·457	...	2·62

In Table VII. the observations are arranged according to the chest measurements. It is seen that with increase in chest measurement there is also a more or less regular increase in vital capacity, though exhibiting similar irregularities as in the case of the stem length, the individual variations here also being much more marked than if they were arranged according to weight. In the same table are also given the individual constants calculated from the formula $\frac{Ch^2.}{V.C.} = K$, as well as the vital capacity calculated from the formula $V.C. = \frac{Ch.^2}{1{\cdot}82}$. Here, again, it will be observed that there is no periodic variation in the size of the constant, the variations being caused only by individual differences. The percentage deviation of observation from calculation is found to be 5·8—a deviation practically identical with that found if the vital capacity be calculated as a function of the stem length by the formula $V.C. = \frac{\lambda^2}{K}$, while it is about three times as great as when the vital capacity is calculated as a function of the body surface by the usual formula. If these observations are arranged in five groups according to the chest measurement and the vital capacity averaged (as done in Table VIII.) the percentage deviation of calculation from observation is reduced to 4·27, or a difference somewhat larger than the deviation found if the vital capacity is calculated by the stem length by means of the proper formula.

The above-mentioned relationship between vital capacity and chest measurement having been established, it became a mathematical necessity that a relationship similar to that which has already been shown between stem length and weight should exist between weight and circumference of chest; in other words, that $\frac{W^n}{Ch.} = K$, and the power n is approximately $\frac{1}{3}$. The proof of the existence of such relationship will be given below.

Relationship Between Circumference of Chest and Body Weight.

In Table IX. are given the weights of the 16 persons and the corresponding chest measurements. There is also to be found the constant $K = \frac{W^{\frac{1}{3}}}{Ch.}$, as well as the chest measurement calculated from the formula $Ch. = \frac{W^{\frac{1}{3}}}{0{\cdot}457}$. 0·457 is the average constant for the 16 individual observations. The percentage deviations of the observed from the calculated circumference of chest are also given.

It is clear that the chest constant shows no periodic variations, but only such irregularities as depend on individual differences. The average percentage deviation of observation from calculation is only 2·62—a difference somewhat smaller than that found by Walker in calculating the stem length from the weight. The mean deviation of observation from calculation, as determined by the method of least squares, is found to be 3·25, which indicates that if an individual be found to differ by about 6 per cent. from the normal chest measure for his weight he is probably abnormal in this respect; and if he exhibit a chest measurement 12 per cent. smaller or larger than the theoretical he is almost certainly abnormal. *Hence it follows that the formula* $\frac{W^n}{Ch.} = K$, *where the power n is approximately* $\frac{1}{3}$, *expresses the relationship between body weight and circumference of chest in an extremely satisfactory manner.*

If from the data given in Table I. we calculate the average constant for stem length and weight by means of the formula $\frac{W^{\frac{1}{3}}}{\lambda} = K$, it is found to be 0·449. If we use this constant in calculating the stem length from the weight by the formula $\lambda = \frac{W^{\frac{1}{3}}}{0{\cdot}449}$, the average percentage deviation of observation from calculation is 2·58, while the mean percentage deviation by the method of least squares is 3·21—or practically identical with those deviations above mentioned, where the chest measurement was calculated from the weight.

From the constants found in the two cases—viz., 0·457 (in case of the chest measurement) and 0·449 (in case of the

stem length)—it follows that in the normal healthy man the circumference of chest is, on an average, about 1·5 per cent. smaller than the stem length, though in a fair number of the individual cases the chest measurement may be greater than the stem length.

The Relationship between Stem Length, Circumference of Chest, and Vital Capacity.

From what has been said above with regard to the relationships of the vital capacity to stem length and chest measurement, and their relationships to body weight, it follows that $\frac{\lambda \times Ch.}{V.C.} = K$. In Table X. this constant is calculated from

TABLE X.

(A) Vital capacity observed (c.cm.).

(B) Constant: $K = \frac{\lambda \times Ch.}{V.C.}$

(C) Vital capacity calculated: $V.C. = \frac{\lambda \times Ch.}{1{\cdot}85}$

(D) Difference between vital capacity calculated and observed (per cent.).

TABLE XI.

(A) Body weight (g.).

(B) $\lambda \times$ Ch. observed.

(C) Constant: $K = \frac{W^{\frac{2}{3}}}{\lambda \times Ch.}$

(D) $\lambda \times$ Ch. calculated: $\lambda \times Ch. = \frac{W^{\frac{2}{3}}}{0{\cdot}21}$

(E) Difference between $\lambda \times$ Ch. calculated and observed (per cent.).

No.	(A)	(B)	(C)	(D)	No.	(A)	(B)	(C)	(D)	(E)
16	2330	2·07	2610	10·75	16	29,800	4826	0·199	4579	5·40
15	2840	1·91	2930	5·07	15	38,900	5438	0·211	5467	0·53
14	3030	1·96	3215	5·75	14	41,200	5944	0·201	5677	4·70
10	3830	1·99	4110	6·81	10	56,300	7604	0·193	7329	3·75
13	3800	1·86	3815	0·39	13	58,600	7044	0·214	7186	1·98
4	4200	1·80	4080	2·94	4	63,500	7548	0·211	7582	0·45
6	4200	1·98	4500	6·67	6	63,500	8316	0·191	7582	9·68
2	4440	1·77	4240	3·77	2	63,500	7833	0·203	7582	3·24
9	4160	1·80	4050	2·72	9	63,500	7497	0·212	7582	1·12
11	4400	1·73	4110	7·06	11	66,900	7826	0·211	7849	0·29
5	4430	1·79	4245	3·65	5	69,100	7852	0·215	8020	2·09
3	4660	1·90	4800	2·92	3	74,600	8872	0·200	8439	5·13
7	4800	1·84	4770	0·63	7	77,400	8821	0·206	8649	1·99
8	4890	1·80	4750	2·95	8	81,000	8796	0·213	8916	1·35
12	5140	1·67	4630	11·01	12	81,100	8568	0·219	8325	4·00
1	5130	1·85	5130	0·00	1	88,800	9465	0·210	9477	0·13
	Average...	1·85	...	4·44		Average	...	0·210	...	2·74

the individual data given in Table I. The average constant is 1·85, and by means of this constant the vital capacity is calculated from the formula $V.C. = \frac{\lambda \times Ch.}{1{\cdot}85}$, as well as the percentage deviation of observed from calculated figures. The average percentage deviation is found to be only 4·44, as compared with 5·76 and 5·80 if the vital capacity were calculated from the stem length and the circumference of chest respectively.

That the agreement between observation and calculation is improved by taking into account both stem length and chest measurement was a priori to be expected, as we are making use of two dimensions instead of one. Moreover, the two measures often tend to correct each other. If, for instance, a person is found to have too big a stem length in proportion to his weight, the circumference of chest is usually too small in proportion to weight. We see, therefore, that the errors thus introduced will be partly, and sometimes entirely, eliminated by taking both measurements into account.

From the various formulæ already given, it follows directly that $\frac{W^n}{\lambda \times Ch.} = K$ where the power n is approximately $\frac{2}{3}$. That this is the case will be seen from Table XI. where the constant $K = \frac{W^{\frac{2}{3}}}{\lambda \times Ch.}$ is calculated from the data in Table I. $\lambda \times$ Ch. is also here calculated from the formula $\lambda \times Ch. = \frac{W^{\frac{2}{3}}}{0{\cdot}21}$, as well as the percentage difference between $\lambda \times$ Ch. observed and $\lambda \times$ Ch. calculated. The percentage deviation of observation from calculation is found to be 2·74—or only slightly greater than when the stem length or the chest measurement individually are calculated from the body weight.

Though the relationships here shown to exist in normal man between vital capacity, body weight, stem length, and chest measurement are all rational relationships, *there can be no question that the most accurate manner in which to express the vital capacity is as a function of the body surface, by means of the formula* $\frac{W^n}{V.C.} = K$, *where n is approximately* $\frac{2}{3}$, *or, more accurately, 0·72.*

The importance and utility of the other relationships at once become obvious when one begins to deal with individuals whose weight has become abnormal as a result of disease—as, for example, in the study of the effect of pulmonary tuberculosis and other diseases definitely resulting in emaciation on vital capacity. For it is evident that with loss of weight a vital capacity which was definitely abnormal when calculated in relation to the normal weight of the person might appear normal if calculated in relation to the reduced weight found during disease, whereas no such interference with the size of the constant would take place if the vital capacity were calculated in relation to stem length, and only to a small extent if calculated in relation to circumference of chest.

By taking all three relationships into account information is therefore gained not only as regards the vital capacity, but also as regards the condition of weight, whether it be increased or decreased beyond the normal measure.

HUTCHINSON'S OBSERVATIONS COMPARED WITH THE FOREGOING RESULTS.

Before dealing any further with my own observations, which have led to conclusions so contrary to those of Hutchinson, it is important to consider his observations, as well as those of others, in the light of what has been said above. I have already given in a previous paragraph the conclusions at which Hutchinson arrived. I shall now proceed to show not only that his observations entirely bear out my own results, but also to point out why he arrived at some of his own erroneous conclusions.

Table XII. is a reprint of Table E (p. 163) in Hutchinson's paper, where the results of his observations on the vital capacity of 1285 men are arranged, the grouping being according to weight, but at the same time keeping the height in view. It is at once seen that the vital capacity *seems* to increase to a maximum at the weight of 150 lb., and then to become stationary, or even decrease. He concludes himself: "It seems the vital capacity increases 42 cubic inches with the weight from 100 to 155 lb., and from 155 to 200 lb., the effect is balanced by minus 5 and plus 5 cubic inches."

It was of interest and importance to examine this marked discrepancy between the results obtained in my own observations, and the mean of results obtained by Hutchinson in observing such a large number of people, and to find out whether the discrepancy was real or only apparent. By analysis of the data given in Table D (p. 162) in Hutchinson's paper, from which he himself had constructed the table reprinted above, it soon became evident that the reason why he reached results so absolutely contrary to those which I have obtained was the manner in which he arrived at his average vital capacity for each given weight. The fact is that he entirely disregarded the number of individuals in each of the series from which he was making up his groups; in other words, in arriving at the average vital capacity for the group, if he has a single case with a very small vital capacity, he gives the same value to this as to 50 or more cases which have a large vital capacity, or vice versa. Such a procedure naturally leads not only to marked irregularities, but to definite errors in the estimation of the proper relationship between vital capacity and body weight.

To prove this point, Table XIII. has been constructed from Hutchinson's Table D (p. 163), and here due consideration has been given to the number of cases in each series in arriving at the average vital capacity for each group. In the same table are also given the values for the constant K in the formula $\frac{W^{\frac{2}{3}}}{V.C.} = K$, as well as the vital capacity expressed in percentage of body weight.

It is seen that the vital capacity increases gradually and steadily from the lowest to the highest weight. There is, in fact, no evidence whatever that from a weight of 150 lb. upwards the vital capacity becomes stationary or decreases, as appears to be the case from Hutchinson's

Table XII. above. It is therefore obvious that his observations are so far entirely in agreement with my own. From Table XIII. it is also seen that if the vital capacity be expressed in percentage of body weight, there is a steady and regular decrease in the percentage as the weight increases, falling from 1·63 per cent. in the lightest, to

TABLE XIII.

(A) Number of individuals in group.
(B) Body weight (lb.).
(C) Vital capacity observed (cubic inches).
(D) Constant: $K = \frac{W^{\frac{2}{3}}}{V.C.}$
(E) Vital capacity calculated: $V.C. = \frac{W^{\frac{2}{3}}}{0{\cdot}128}$
(F) Difference between vital capacity calculated and observed (per cent.).
(G) Vital capacity as percentage of body weight.
(H) Vital capacity calculated as per cent. (1·47) of body weight.
(I) Difference between vital capacity calculated and observed (per cent.).

TABLE XII.

(A) Body weight (lb.)
(B) Vital capacity (cubic inches).

(A)	(B)	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
110	181	63	110	179·5	0·128	179·4	0·06	1·63	161·7	11·01
130	199	318	130	200·0	0·128	200·5	0·25	1·54	191·1	4·64
		504	150	221·6	0·127	220·6	0·45	1·48	220·5	0·50
150	223	304	170	233·6	0·124	233·7	0·46	1·40	249·9	4·52
170	218	98	190	245·6	0·135	258·3	4·92	1·29	279·3	12·07
190	223	1285	Average ...		0·128	...	0·72	1·47	...	3·86

1·29 per cent. in the heaviest, group; while if it be expressed in relation to the body weight to the $\frac{2}{3}$ power, the relationship is constant. *Thus in Hutchinson's observations also we find that the vital capacity is a function of the surface of the body*, correctly expressed by the formula $\frac{W^n}{V.C.} = K$, where the power n is approximately $\frac{2}{3}$, so proving from his own data and observations how erroneous was his conclusion that no definite relationship between vital capacity and body weight could exist.

Furthermore, in Table XIII. the vital capacity is calculated as a function of the body surface by means of the formula $V.C. = \frac{W^{\frac{2}{3}}}{0{\cdot}128}$ and also as a simple function of the body weight from the formula $V.C. = W \times 1{\cdot}47$, as well as the percentage difference between observation and calculation by these two procedures. In the first case the average percentage deviation is only 0·72, taking the numbers in the groups into consideration, while in the latter case the average deviation is as much as 3·86 or about five times as great as in the former.

To take the matter a step further, we will now test the validity of Hutchinson's statement that there exists a simple relationship between the height of the individual and his vital capacity. In Table XIV. are given the average vital

TABLE XIV.

(A) Number of individuals in group.
(B) Standing height (inches).
(C) Vital capacity observed as tabulated by *Hutchinson* (cubic inches).
(D) Vital capacity observed *correctly* tabulated (cubic inches).
(E) Vital capacity calculated from height by Hutchinson.
(F) Difference between vital capacity calculated and observed (per cent.).

(A)	(B)	(C)	(D)	(E)	(F)
36	61	176·0	171·7	174	1·32
99	63	191·0	185·6	190	2·32
239	65	207·0	200·2	206	2·82
697	67	228·0	232·2	222	4·59
530	69	241·0	238·4	238	0·17
226	71	258·0	255·0	254	0·39
1827			Average		2·37

capacities for Hutchinson's observations, detailed in Table A (p. 156), as tabulated by him for heights ranging from 5 ft. to 6 ft. inclusive; also the average vital capacities for the corresponding heights arrived at by my calculation, which takes into account the number of individuals in each series forming the groups, as should obviously be done. There is also given the series of vital capacities in arithmetical progression as calculated by Hutchinson; and, finally, the percentage deviation of observation from calculation. It is seen that, considering the number of individuals in each group, this deviation is as much as 2·37 per cent., which is an error more than three times as great as the percentage difference found above between observation and calculation; for when the same data was expressed as a function of the body surface the deviation was only 0·72 per cent. Thus it is evident from Hutchinson's observations, as well as from my own, that the vital capacity of man is *not* a simple function of the body height, as he contended, since it increases in an irregular manner and not at a fixed rate with each unit increase in height.

The Variations of Vital Capacity in Normal Individuals.

Having once established the actual existing relationships between vital capacity and different body measurements, it is necessary to determine the magnitude of the deviations from the average met with in normal and healthy individuals, as it is otherwise impossible to decide whether the vital capacity found in any given person should be considered as normal or abnormal.

In the case of the 16 persons examined, the average constant in the formula $\frac{W^n}{V.C.} = K$, was found to be 0·380 if the power n be taken as $\frac{2}{3}$ and 0·690 if the best power, 0·72, be used. The mean deviation of observation from calculation, employing the method of least squares, was found in the two cases to be 3·56 and 2·64 per cent. respectively, or distinctly greater if the power $\frac{2}{3}$ is used. This indicates that if a person is found to have a vital capacity 6 per cent. smaller or larger than that calculated from his surface by means of the formula $\frac{W^n}{V.C.} = K$, where n is 0·72, it is probable that he has an abnormal vital capacity, and if the vital capacity is 10 per cent. above or below the normal it is almost certain that he is abnormal in this respect.

If we deal with the material of Haldane and FitzGerald on 11 men in a similar manner we find that if the vital capacity be calculated as a function of the surface the mean deviation by the method of least squares for the individual observations are as much as 15·8 per cent., or a mean deviation five times greater than that found in my own observations. The explanation of this enormous difference is most likely to be found in the fact that their observations have been carried out on a highly mixed material, and therefore necessarily exhibit great individual variations. The existence of such individual differences and their causes is a factor of the utmost importance in attempting to fix definite standard limits of vital capacity in normal persons, as will be shown in the following paragraph.

Variations of Vital Capacity in Normal Individuals of Different Classes and Occupations.

In the course of further observations on the vital capacity in apparently normal persons of various classes and positions it became evident that a distinct variation was found in the vital capacity constant, resulting upon the varying nature of the life and habits of the individuals in question. It was therefore obvious that unless due attention were paid to these influences any fixed standard would become vitiated by them. Fortunately, we possess in Hutchinson's careful observations a material which, when properly used, gives us important information with regard to the value of the vital capacity in judging the physical fitness and development of different classes of the population.

To demonstrate this fact I have compiled and calculated some 1900 cases from Hutchinson's recorded observations. I have classified these men according to their occupation, and calculated the vital capacity constant from the formula $\frac{W^{\frac{2}{3}}}{V.C.} = K$. The results of the calculation are given in Table XV. Before calculation Hutchinson's observations, recorded in pounds and cubic inches, were reduced to grammes and cubic centimetres, the weight of the body being the net weight without clothing. From the construction of the formula it is obvious that the larger the constant the smaller the vital capacity for any given weight. The classes are arranged according to vital capacity, that with the highest vital capacity heading the list, and the remainder being graded in order of decreasing rate.

TABLE XV.

(A) Number of individuals in group.
(B) Vital capacity constant: $K = \frac{W^{\frac{2}{3}}}{V.C.}$
(C) Physical fitness (per cent.).

(A)	Occupation.	(B)	(C)	(A)	Occupation.	(B)	(C)
172	Chatham recruits.	0·412	100·0	69	Grenadier Guards	0·441	93·4
27	Pugilists.	0·420	98·1	20	Draymen.	0·433	93·0
563	Woolwich marines.	0·425	96·9	23	Pressmen.	0·450	91·5
119	Seamen.	0·428	96·7	158	Mixed classes.	0·455	90·4
74	Thames police.	0·427	96·4	82	Miscellaneous.	0·458	89·9
30	Horse Guards.	0·433	95·1	47	Compositors.	0·467	88·1
130	Metropolitan police.	0·434	94·8	101	Gentlemen.	0·488	84·3
92	Fire brigade.	0·439	93·7	116	Paupers.	0·499	82·5

It is seen that Hutchinson's "Chatham Recruits" represent the best class, and it is interesting to note that he himself characterises these individuals as "a remarkably fine body of young men." Taking the constant calculated from this group of men as representing 100 per cent. of physical fitness, the fitness of the other classes appears in the table in percentage of this class. It is noted that the percentage falls steadily from 100 per cent. in the best class in a way that might be expected from the nature of the occupations of the different groups, until we come to paupers, with about 20 per cent. less vital capacity than the best group. It will be observed, probably with some astonishment, how very low is the position taken in this respect by the class of gentlemen in 1846—a fact doubtless connected with the life and habits of gentlemen in London at that date.

Table XV. indicates that it would appear promising to make use of the vital capacity in its proper relation to the size of the body to obtain important knowledge regarding the physical condition of the various classes of the population, and to express this in relation to the standard of perfect health.

In Table XVI. I have arranged my own observations of a few classes of the people of the present day. Here also the constant is calculated from the formula $\frac{W^{\frac{2}{3}}}{V.C.} = K$, the weight is net weight in grammes, without clothing, and the vital capacity expressed in cubic centimetres. The constants

TABLE XVI.

(A) Numbers of individuals in group.
(B) Vital capacity constant: $K = \frac{W^{\frac{2}{3}}}{V.C.}$
(C) Physical fitness (per cent.).

(A)	Occupation.	(B)	(C)
16	Men and adolescents selected for physical fitness	0·380	108·3
14	Oxford undergraduates (own).	0·380	108·3
959	,, ,, (Schuster's).	0·381	108·1
7	Boy Scouts.	0·390	105·7
12	Men (mixed upper class).	0·416	99·0
12	,, (,, lower ,,).	0·445	92·6
12	Females (mixed classes).	0·493	83·6

are therefore directly comparable with those in the above table, and the percentages were expressed in percentages of Hutchinson's "Chatham Recruits," equalling 100 per cent. of fitness.

It is most interesting to observe from this table how the active, athletic class of gentlemen of the present day heads the group of my own observations with actually 9 per cent. more relative fitness than the above-mentioned "remarkably fine body of young men."

From observations that I have made it seems clear that the difference in vital capacity exhibited by different classes has nothing to do with fundamental bodily deficiencies, but is simply a result of conditions depending upon occupation and mode of life. Taking, for example, two sets of boys from the same elementary school, from similar homes and living under similar conditions—with the exception, however, that one of the two sets of boys were Boy Scouts—it was found that the latter had, on an average, a vital capacity constant approaching the magnitude of that found in Oxford undergraduates, and exhibited a vital capacity of about 15 per cent. greater than that of the lads who were not Boy Scouts. The army training has brought out, in those who have undergone it, the same marked increase in vital capacity when they are compared with similar classes of the population who have not had this physical training.

The Fixing of Standards of Normal Vital Capacity.

From a comparison of the results obtained on the limited number of individuals hitherto examined sufficient information has been gathered to make it clear that it would not be justifiable to employ the data collected by Hutchinson for the fixing of standards for the different classes of the population at the present date. Before definite and valid standards can be arrived at it is inevitable that a relatively large number of subjects drawn from the different classes and trades of the population must be examined in regard to vital capacity and various body measurements. To help to carry out this extensive scheme the Medical Research Committee have already undertaken to give financial aid, and it is hoped that this inquiry may take its place in a larger scheme for the study of anthropometric standards.

At the present moment I can only consider the standard fixed from the examination of Oxford undergraduates as an accurate standard for this particular class of population. The average constants arrived at from my own observations upon 14 Oxford undergraduates were as follows: $\frac{W^{0·72}}{V.C.} = 0·69$; $\frac{\lambda^2}{V.C.} = 1·9$; $\frac{Ch.^2}{V.C.} = 1·82$.

Before accepting these constants, obtained from a very limited number of observations, as valid standards it became important to see how they would compare with the constants that could be obtained from calculation of Schuster's extensive series of measurements of vital capacity in 959 Oxford undergraduates. In Table XVII. I have

TABLE XVII.

(A) Number of individuals in group.
(B) Body weight (g.).
(C) Stem length (cm.).
(D) Vital capacity (c.cm.).
(E) Constant: $K = \frac{W^{\frac{2}{3}}}{V.C.}$
(F) Constant: $K = \frac{W^{0·72}}{V.C.}$
(G) Constant: $K = \frac{\lambda^2}{V.C.}$

(A)	Age.	(B)	(C)	(D)	(E)	(F)	(G)
129	18	64,210	88·5	4184	0·383	0·691	1·87
219	20	66,100	90·4	4268	0·383	0·691	1·91
59	23	66,100	90·4	4418	0·370	0·669	1·85
330	19	66,240	90·5	4278	0·383	0·691	1·92
95	22	66,480	90·4	4301	0·381	0·689	1·90
137	21	68,000	91·1	4438	0·375	0·679	1·87
				Average	0·381	0·690	1·90

made an abstract from Schuster's data. The weights are net weights in grammes, arrived at by the substraction of the weight of clothing, using the proper reduction factor; the stem lengths in centimetres are the stem lengths recorded by Schuster, reduced by 3 per cent. This reduction is necessary to make the measurements comparable with my own observations, for it was found, as previously stated, that the measurement obtained by seating a person on a chair is about 3 per cent. greater than that obtained by measuring the stem length in the manner used in my own observations. The vital capacities are given in cubic centimetres.

In this table is calculated the constant K, by means of the formula $\frac{W^n}{V.C.} = K$, both when the power n is taken as $\frac{2}{3}$ and when the best n (0·72) is used, as well as the K for the formula $\frac{\lambda^2}{V.C.} = K$. The constants found are $\frac{W^{\frac{2}{3}}}{V.C.} = 0·381$; $\frac{W^{0·72}}{V.C.} = 0·690$; $\frac{\lambda^2}{V.C.} = 1·90$. It is striking to see that the constants arrived at by an analysis of this

extensive series of careful observations of 959 Oxford undergraduates are absolutely identical with those found in my own very limited number, and also the same as those obtained in the 16 observations on persons selected for their physical fitness. In view of this fact, therefore, it seems entirely justifiable to accept these standards as true standards for the measurement of a condition of the most perfect health and fitness at the present time.

Vital Capacity in Relation to Diagnosis of Disease.

Since the vital capacity has been shown to exhibit such marked variations in the different classes of the population, depending upon their mode of life, and has also been shown during the war to be influenced by the strain on flying men (continued flying in high altitudes resulting in a temporary diminution of vital capacity), it is likely that various forms of fatigue would be found to influence it in the same manner. If this be the case it is probable that certain diseased conditions, more particularly of the respiratory and circulatory organs, would lead to a distinct diminution in the vital capacity. One's mind naturally turns at once to the question of the effect of pulmonary tuberculosis on vital capacity. This application is not novel, as already in 1846 Hutchinson had made use of the study of vital capacity as a help in diagnosis of diseases of the lungs—more particularly tuberculosis. He showed that cases of pulmonary tuberculosis exhibited a vital capacity distinctly inferior to what he considered normal, judging from the height of the individual.

From what has already been said it is self-evident that it is impossible to deduce valuable conclusions regarding the effect of disease on vital capacity before definite standards have been worked out for the various classes of the normal population. By means, however, of a few undoubtedly fairly accurate standards so far arrived at it has been possible to approach the study of the effect of pulmonary tuberculosis on vital capacity. And although it would be premature at the present moment to express a final opinion as regards the value of this method, it can already be stated that it has yielded very promising results in the examination of about 150 cases of pulmonary tuberculosis which I myself have dealt with in collaboration with Dr. L. S.T. Burrell, of the Brompton Hospital. The particulars of the results obtained will be published in detail when sufficient material has been collected and analysed. At the present moment I can only state the following: that I have been able, without seeing the cases or knowing anything about the diagnosis, but simply from measurements (recorded and sent to me by Dr. Burrell) of the vital capacity and the various body measurements mentioned above and by subsequent calculation, to classify these persons as normal individuals, or as examples of mild, of moderate, or of severe pulmonary tuberculosis, in practically absolute agreement, as afterwards appeared, with the clinical diagnosis and classification made at the time at the Brompton Hospital.

From the experience already gained it seems likely that the careful study of the vital capacity in its proper relationship to body size will give important information as to the beneficial effects derived from sanatorium treatment of pulmonary tuberculosis, and also enable us to distinguish between those cases likely to benefit from continued treatment and those for whom it would be of no further profit.

CONCLUSION.

From a consideration of the results arrived at in the present communication it seems likely that systematic measurement of the "vital capacity" and various body measures indicated above, in adults and adolescents in different trades and occupations, and in different ranks of life, will afford most important information from the point of view of national health, and will throw light upon the value of such measures as may be contemplated for the improvement of the general health and well-being of the people of this and other countries.

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THE ÆTIOLOGY OF INFLUENZA.

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THE following is a section of a longer article dealing with influenza from the point of view of clinical signs and symptoms, and describing the results obtained by various therapeutic methods.

Ætiology of the Disease.

The cause of the disease will be discovered in the laboratory. Clinical observations enable one to diagnose it in the great majority of instances, but until the infective agent is described and uncontrovertibly recognised as such, diagnosis of obscure cases will remain doubtful.

In respect of influenza, bacteriologists are divisible into two classes—those who believe in the Pfeiffer concept, and the rest. At the commencement of this epidemic the generally accepted view was that Pfeiffer's bacillus is the cause of influenza, and it is interesting to see what has arisen to shake one's confidence in this orthodoxy.

Pfeiffer,[1] in January, 1892, described a bacillus as occurring in the sputum of acute cases of influenza. These organisms, he stated, were constantly present, but do not occur in the bronchial secretion of other bronchial or pulmonary affections. The bacillus has the following characteristics: It is very minute, about half the length, and the same thickness as the bacilli of Koch's mouse septicæmia. It is non-motile. It stains with difficulty with the aniline dyes, but when stained shows a granule at each end retaining the stain and a central unstained portion, showing only the outline of the sheath. The bacillus thus looks like a diplococcus, and where two such bacilli are placed end to end they look like a chain of four spherical cocci.

Kitasato in the same paper describes the cultural characteristics of the bacillus. It does not grow below 28° C. It grows well in broth and on glycerine agar at 37° C. The growth in broth appears as whitish small granules or flocculi, and the broth does not become turbid. The cultures soon die out—stained specimens from the cultures show the same bi-polar staining.

Pfeiffer later showed that the addition of blood to the culture medium greatly enhances the growth of the bacillus—especially on subcultures, and for this purpose smeared blood over the surface of the agar medium.

Klein[2] examined films of sputum in 20 cases of influenza, during February and March, 1892, and found the bacillus of Pfeiffer present in every case. The films were stained with carbol methyl blue. The organism was a minute bacillus ($0{\cdot}4\,\mu \times 0{\cdot}8\,\mu$), with rounded ends and bi-polar staining. From washed sputum pure cultures were obtained in broth, and if subcultures were made every two or three days, the growth could apparently be carried on indefinitely. Growth was also obtained on ordinary agar, and subcultures for as many as 20 generations obtained.

Films made from the cultures showed the bacilli growing in long twisted threads or chains, the bacilli being placed end to end and enclosed in a continuous sheath. In all specimens, no matter how recent, spherical or oval bulli appear, many times thicker than the typical bacillus. The number of these spheres is greater in later than in recent cultures and the largest of them often show a vacuole in their centre or at one side.

Canon, at the same time as Pfeiffer and Kitasato and in the same paper (vide Pfeiffer[1]), stated that he examined influenzal blood by making cover-slip films. The films were dried, fixed in absolute alcohol, and stained in methyl blue eosin for several hours at 37° C. He states that in every case he saw 5 to 20 bacilli in each cover-slip film, and these bacilli were definite and pathognomonic of the disease. Further, he states that by using 8 to 12 drops of blood he succeeded in every case in growing the bacillus on sugar agar.

Klein[2] examined 43 cases, and only found bacilli in cover-glass blood films in six of these. The bacilli had the characteristics of Pfeiffer's bacillus, but in no case was a growth obtained on subculture. He concludes that "any bacilli of influenza that may gain access to the circulation lose here their vitality and are present in the blood only as dead bacilli."

Klein also performed animal inoculation experiments, using sputum containing Pfeiffer's bacilli, and broth cultures of the bacilli as the inoculum. Rabbits and monkeys were injected, but although the subcutaneous, intravenous, and intratracheal routes were employed, in no case was the disease reproduced. The position at the commencement of the present epidemic was therefore this—a bacillus

was described which was found in the sputum in every acute case of influenza; it was also seen in the blood in a certain number of cases. Attempts to reproduce the disease in animals by injecting the bacillus had failed. It was generally considered that the bacillus was only seen in material obtained from patients suffering from influenza.

Now one may say that there is considerable doubt as to whether Pfeiffer's bacillus is the cause of influenza. Many papers have been published by workers in Europe on the bacteriology of influenza during the present epidemic, and their results are by no means concordant. The examinations comprise those of posterior nasal swabs, sputum, pleural effusions, blood, and post-mortem materials—chiefly lungs and lymphatic glands. The results of these investigations are shown below.

Posterior Nasal Swabs.

In the following table (I.) accounts of the experiments of eight different observers have been noted, and from the results shown it will be seen that Pfeiffer's bacillus or a diplococcus has been obtained.

TABLE I.

Observer.	No. of cases.	Pfeiffer's bacillus found.	Cocci.
		Per cent.	Per cent.
Abrahams, Hallows, and French [3] ...	10	50	100
Whittingham and Sims [4]	50	38	100
Braxton Hicks and Gray [5]	?	80	100
Little, Garofalo, and Williams [6]	20	0	100
Averil, Young, and Griffiths [7]	16	0	100
Matthews [8]	12	100	100
McIntosh [9]	12	66 8	100
Fildes, Baker, and Thompson [10]	15	80	100

The net result of these various investigations is that Pfeiffer's bacillus has been found in 51·8 per cent. of cases of naso-pharyngeal swabs taken from influenzal patients, cocci being also found in every case.

Sputum.

The result of the observations shown in Table II. is that Pfeiffer's bacillus has been found in the sputum in 42 per cent. of cases.

TABLE II.

Observer.	No. of cases.	Pfeiffer's bacillus found.	Observer.	No. of cases.	Pfeiffer's bacillus found.
		Per cent.			Per cent.
Gotch and Whittingham [11] ...	50	8	McIntosh [9]	25	84
Braxton Hicks and Gray [5] ...	?	75	Fildes [10]	106	43
Little, Garofalo, and Williams [6]	20	0	Leichentritt [13] ...	72	60
Averil, Young, and Griffiths [7]	41	78	Löwenfeld [14] ...	55	71
Selter [12]	33	0	Graetz [15]	182	1·5

As regards other organisms, Gotch and Whittingham [11] found a Gram-negative micrococcus resembling *Micrococcus catarrhalis* in 100 per cent. of cases during the first wave of the epidemic. Little, Garofalo, and Williams found a Gram-positive diplococcus with flattened adjacent sides in 100 per cent. of cases, whereas Bernhardt [16] describes a Gram-positive diplococcus (*Diplococcus epidemicus*) as occurring in all cases.

Pleural Effusions.

Netter [17] examined 12 cases (all purulent) and found Pfeiffer's bacillus in 8 per cent. Braxton Hicks and Gray [5] found Pfeiffer's bacillus on two occasions in pleural exudate, in addition to a diplostreptococcus. This latter organism was allied to, if not identical with, the *Streptococcus mucosus* (of Stephan [18]), and was found in every case of pleural effusion, but the number of cases examined is not given.

Blood cultures.—These have either proved sterile, yielded Pfeiffer's bacillus or a coccus (of different varieties) in the proportions shown in Table III.

The resultant of this series is that 82 8 per cent. of blood cultures have proved sterile, 7·8 have yielded Pfeiffer's bacillus, and 9 4 per cent. cocci of different varieties. The cocci which Whittingham and Sims [4] found in their blood cultures were of different varieties—a streptococcus, a pneumococcus, and a *Diplococcus mucosus* (Stephan [18]) in the relative proportions of 5, 1, and 1. This *Diplococcus mucosus*

TABLE III.

Observer.	No. of cases.	Sterile.	Pfeiffer's bacillus found.	Cocci found.
		Per cent.	Per cent.	Per cent.
Abrahams, Hallows, and French [3]	10 [a]	90	—	10
Whittingham and Sims [4] ...	50	86	—	14
Braxton Hicks and Gray [5] ...	?	50	—	50
Little, Garofalo, and Williams [6]	20	100	—	—
Averil, Young, and Griffiths [7]	9	100	—	—
Gotch and Whittingham [11] ...	?	100	—	—
Netter [17]	12	83·4	16 6	—
McIntosh [9]	10	80	—	20
Fildes, Baker, and Thompson [10]	?	100	—	—
Orticoni and Barbié [19]	62	39	61	Yes. [a]

[a] ? How much.

was described by Stephan [18] at the end of the year 1916. He isolated it in an extensive outbreak of influenza in Strumpell's clinic at Leipsic, and obtained it both from blood and sputum. The cultural characteristics of this organism are described later. Post mortem Segale [20] obtained another coccus from heart blood. He called it the *Streptococcus pandemicus*, and finding it also in spinal fluid and lymphatic ganglia had 55 per cent. positive results in a series of 54 cases.

Post-mortem Material: Lungs and Lymph Glands.

In the post-mortem examination shown in Table IV. Pfeiffer's bacillus was found in 38·3 per cent. of cases, and cocci of different varieties in 47·5 per cent. of cases.

TABLE IV.

Observer.	No. o cases.	Pfeiffer's bacillus found.	Cocci.	Other organisms
		Per cent.	Per cent.	Per cent.
Abrahams, Hallows, and French [3]	28	25	96	—
Braxton Hicks and Gray [5] ...	?	0	?	—
Fletcher [21]	36	30·5	44·3	—
Netter [17]	7	71	?	—
Harris [22]	2	0	0	100 [a]
Segale [20]	?	0	50	—
Leichentritt [13]	6	100	—	—
Löwenfeld [14]	45	80	—	—

[a] An organism resembling *B. pestis.*

Thus Abrahams, Hallows, and French [3] found a *Streptococcus longus* in 36 per cent. of cases, a diplostreptococcus in 36 per cent. of cases, and a pneumococcus in 26 per cent. of cases. Fletcher [21] found a meningococcus in 30·5 per cent. of cases, a pneumococcus in 8·3 per cent. of cases, and a streptococcus in 5·5 per cent. of cases. The organism found by Segale [20] was his *Streptococcus pandemicus*.

From the publications during the present epidemic, which have been quoted above, we see that Pfeiffer's bacillus has been isolated from—

Naso-pharyngeal swabs	in 51·8	per cent.	of cases.
Sputum	,, 42	,,	,,
Pleural fluids	,, 8	,,	,,
Blood	,, 7·8	,,	,,
Lungs and lymph glands	,, 38·3	,,	,,

During the epidemic various media have been devised which have been considered to have a specially selective action favouring the growth of Pfeiffer's bacillus. These are blood media in which the blood has been subjected to the action of trypsin, as in Matthews's medium,[8] or boiled as in Levinthal's medium.[23] Thus, Fildes [10] states "the classical blood-agar medium has been practically useless under the conditions met with," but using Levinthal's medium he recovered Pfeiffer's bacillus in a high percentage of cases. Fleming [24] stated that if blood is boiled with

water, and only the clear filtrate added to agar, an efficient medium for growing influenza bacilli is obtained, and I suggest that it is possible that the essential element is iron which is liberated from the hæmoglobin by boiling and present in the filtrate.

On the other side we have the records of observers who have examined large numbers of cases and used the very latest and most fashionable media, and yet failed to obtain Pfeiffer's bacillus in more than an inconsiderable percentage of cases, and we must remember that the bacillus was first isolated without the use even of the simplest form of blood medium, and was stated to grow in broth cultures.

The case for Pfeiffer's bacillus is still further weakened by the fact that it has been found in cases which are not influenzal in nature. Thus, Fildes[10] examined 71 naso-pharyngeal swabs from healthy individuals and found Pfeiffer's bacillus in 21 per cent. Fleischmann[25] has shown that Pfeiffer's bacillus may be found in healthy tonsils, and in the tonsils in diphtheria and scarlet fever; also in broncho-pneumonia occurring as a complication of measles, and in tuberculous cavities in lungs, and in bronchiectasis.

The organism does not, therefore, fulfil even the first postulate of Koch for specificity—which states that it shall be found in every case in lesions typical of the disease, and there alone. It has not been shown to be pathogenic to animals, and it only produces slight serological reactions in man during infection.

Ford Robertson,[26] a staunch supporter of the Pfeiffer school, states that by injection into man of a killed culture of Pfeiffer's bacilli he can at will produce a "controlled attack of influenza." How he can prove that the reaction following the giving of the vaccine differs in any way from that following the injection of any other vaccine he does not state; but to assert that an attack of the specific disease influenza is produced requires some evidence to support it, and that is not given.

If Pfeiffer's bacillus is not considered to be the cause of influenza, what alternatives are left?

First of all, the infective agent may be of small size and belong to the class of filter-passers. Nicolle and Lebailly[27] showed in October, 1918, that filtered sputum of influenzal cases reproduced the disease in man when inoculated by the subcutaneous route; further, he used unfiltered sputum and injected it by the subconjunctival and nasal routes in monkeys, and produced a disease resembling influenza. Since then Gibson, Bowman and Connor,[28] and Rose Bradford, Bashford and Wilson,[29] working independently, have published results showing that a filtrable virus exists in material obtained from influenza patients (sputum, blood, pleural fluid). This virus, when injected into animals—monkeys and guinea-pigs—produces in some cases death, in others illness. Post mortem the lesions found in the lungs, trachea, pleura, and heart muscle resemble those seen post mortem in man in influenza. From this material the virus is recoverable, and by animal passage increases in virulence. It is anaerobic and can be grown by the Noguchi method.

It is thus demonstrated that a virus which is a filter-passer can be obtained from influenzal material; but whether the disease produced in the animals is influenza still requires proof. Leschke,[30] working with the filtrate obtained from an influenzal lung, sprayed man and produced typical attacks of influenza. In one instance two people who nursed the sprayed individual developed the disease.

Although the amount of work which has been done on filter-passing organisms in influenza is small, yet the evidence is weighty as regards the presence of a filtrable virus, but yet insufficient to prove that it is the actual causative agent either in toto or merely as a stage in the life-history of a larger organism.

The cocci.—Authors who have been unsuccessful in their search for Pfeiffer's bacillus, and who have not experimented with the filter-candle, have described cocci and put forward the suggestion that here we have the actual cause of the disease. Gotch and Whittingham[11] described a Gram-negative micrococcus occurring in all cases in the sputum and naso-pharyngeal swab cultures as the predominating organism. They inoculated it on the naso-pharynx of two healthy individuals and "produced the disease in a typical form." They therefore conclude that this micrococcus is probably the specific organism, either alone or in conjunction with *B. influenzæ* (Pfeiffer). The cultural characteristics of this organism are not described.

Whittingham and Sims[4] obtained from blood cultures streptococci, pneumococci, and an organism resembling the *Diplococcus mucosus* of Stephan.[18] When first isolated it is Gram-negative, but on subculture not only does its staining by Gram become variable, but it assumes a pleomorphic form—oval diplococci and bacillary forms appearing. These bacillary forms are always Gram-negative, stain readily with dilute carbol fuchsin and grow on ordinary agar. They occur mixed with the cocci in individual plate colonies.

Donaldson[31] has published some most suggestive notes on his bacteriological findings. In the first place he failed to find Pfeiffer's bacillus in every case examined, but he found constantly an organism previously undescribed. This is a coccus which he calls the organism "D." It is characterised by its remarkable pleomorphism.

"It may grow in the form of enormous bacilli, or as extremely long chains of giant cocci, or cocci alternating with giant bacilli of all shapes. Later on it loses this pleomorphism and comes to resemble a staphylococcus, and finally assumes the form of large deeply Gram-positive tetrads. The cultural characters vary with the different morphological phases, and it shows an extraordinary variability towards Gram's stain."

Donaldson also suggests that there may be a filter-passing stage to this organism. Rosenow[32] has described a similar pleomorphic coccus in acute epidemic poliomyelitis. Crookshank[33] has pointed out the resemblance between Rosenow's coccus, the organism found by Rajchman in encephalitis lethargica, and Donaldson's organism. Further, he points out that Rajchman from his pure cultures of "Rosenow" produced under strict anaerobiasis a free growth of minute bodies resembling Flexner's "globoid bodies" and also those obtained by Rose Bradford, Bashford and Wilson[29] from the filtrable virus in influenza.

The sugar reactions of various cocci isolated in influenza are given in Table V.

TABLE V.

Organisms.	Morphology.	Glucose.	Lactose.	Saccharose.	Maltose.	Mannite.	Lævulose.	Milk.
Donaldson's "D" organism.	Pleomorphic coccal and bacillary forms.	A.	A.	A.	A.	—	—	A.
Diplococcus mucosus (Stephan).	"	A.	—	A.	A.	—	—	A.C
Diplococcus pandemicus (Segale).	Gram + pairs and short chains of cocci	A.	A.	—	A.	—	—	—

A. = Acid. A.C = Acid clot.

The result of these investigations is that it has been demonstrated that in this epidemic a diplococcus, often growing in chains, has been present very constantly in the sputum, occasionally in blood, naso-pharyngeal swabs, and post-mortem material. The coccus is pleomorphic and variable in Gram staining, and possibly also in its sugar reactions.

Evidence that this pleomorphic coccus is the actual causative agent in influenza is at present incomplete.

Bacteriological Investigations.

I did not begin active laboratory work in connexion with influenza until the commencement of January, 1919. At that period I was impressed by two facts—the relative infrequency with which Pfeiffer's bacillus was being found, and the significance of the observations of Donaldson[31] on his pleomorphic organism "D" and its possible relation to the filtrable virus obtained by Nicolle[27] and Gibson.[28] Further, Captain H. J. B. Fry, R.A.M.C. (T.), pathologist at No. — General Hospital, had obtained results which suggested the occurrence of two other stages in the life-history of the parasite—a large spore stage and a hyphal stage. The results I am about to describe are those of my own experiments conducted in the laboratory of No. — General Hospital, which was then in the charge of Captain Fry. Much work has been done by Captain Fry alone, both before and after I commenced my investigations, and he has already sent in for publication a preliminary note on his findings. I therefore make no claim for originality, and the deductions drawn are merely the sequence of the deductions of previous observers.

Examination of sputum.—Sputum was collected in sterile Petri dishes and examined shortly after expectoration. Films were made and stained by Gram's method, carbol-fuchsin being used as a counter stain. In certain cases the sputum was examined daily throughout the disease; in others only one examination was made. A large number of sputa have thus been looked at. Examination of these films shows the presence of a variety of organisms, and it is suggested that certain of these are stages in the life-history of a mycotic parasite—that, in other words, influenza is a mycosis.

The evidence that is forthcoming to support this view will be detailed below, but a preliminary statement will help to unify the bacteriological findings and enable them to be considered in what is believed to be their true relations one to another.

Film preparations made from material from two sources show most, if not all, the different stages of the parasite; these sources are the lungs and the intestines. Thus sputum in cases of influenzal bronchitis or broncho-pneumonia, and fæces in cases of influenzal enteritis, yield films which when stained by Gram's method show the following forms:—

1. *Hyphæ*, septate and branching.—In their substance large round or oval spores 4 to 5 μ in diameter may be formed, or smaller spores or smaller coccal bodies which occur in diplococcal and streptococcal forms. Further small exospores may be seen attached to and shed from their exterior. The finer filaments may septate into bacillary forms.

2. *Large spores* may occur singly or in groups. They may be round, oval, or elongated, and shaped like Zeppelins or spindles. Generally retaining Gram's stain with avidity, in some cases they are Gram-negative, or have a Gram-positive centre with a Gram-negative periphery. Further, they may be frankly Gram-negative, and contain Gram-positive granules. When seen unstained in hanging drop preparation they appear to have a smaller circular body inside the main body. Their size is about 5μ in diameter.

1, Hyphæ; 2, large spores; 3, coccal clusters; 4, small spores; 5, tetrads; 6, mulberry masses; 7, chains of cocci in hyphæ; 8, bacilli.

3. *Coccal clusters.*—These consist of aggregations of small cocci, 0·5 to 1 μ in diameter, in circular masses. Generally they are Gram-negative, and contain towards the centre one or more larger Gram-positive coccal forms. They are believed to be derived from the large spores.

4. *Small spores.*—These are circular Gram-positive or negative bodies, about 2 μ in diameter. They may divide and form—

5. *Tetrads*, which are almost invariably intensely Gram-positive, or

6. *Mulberry masses*, which are knobby agglomerations of Gram-positive bodies, formed by incomplete fission of the small spores.

7. *Chains of cocci.*—These are often diplococci or diplostreptococci, and may be small with flattened opposed surfaces, and variable in Gram staining. Four, six, eight, or ten occur in a chain, or they may be larger and ovoid, forming a *Streptococcus maximus*, and not then tending to vary in Gram's stain, all the elements being Gram-positive.

8. *Bacilli.*—Large Gram-positive or Gram-negative rods, 2 to 3 μ in length and 0·5 μ in breadth. Smaller Gram-positive or negative bacilli, down to minute Gram-negative bacilli, morphologically resembling that of Pfeiffer: intermediate cocco-bacillary forms also occur.

The connexion between these stages is put forward diagrammatically (as shown above).

Returning now to the actual examination, and dealing first with *sputum*; in all cases in which films were made from cases of influenza a large number of the above stages were seen, the commonest being coccal clusters, hyphæ, large spores, and diplostreptococci. Pfeiffer-like bacilli were not often noticed.

Dealing now with special cases, that of Case 124, which proved fatal on the sixteenth day of the disease, showed on the eighth day bright green purulent sputum. This contained groups of Gram-positive and Gram-negative large spores in great numbers, the only other organism being small Gram-negative bacilli in chains, and Gram-positive and Gram-negative minute cocci in clusters. (Fig. 1A.) The sputum of the next day showed many large Gram-negative spores, many minute Gram-negative cocci, and a few Gram-negative hyphal threads. This was cultured on to trypsinised serum-glucose agar and showed an apparently pure growth in 18 hours of minute circular, slightly raised, transparent colonies—a little iridescent by transmitted light, and about 0·5 mm. in diameter.

Examination of a film made from a single colony showed small Gram-positive cocci and a few Gram-negative bacilli, and Gram-negative large spores with Gram-positive cocci attached to their periphery. This culture was kept 3 days at 37° C. and 13 days at room temperature, and then showed a thick, uniform, diffuse, white heaped-up growth, glistening strongly by reflected light. A film showed this to be an almost pure culture of Gram-positive large spores, together with some Gram-negative large spores containing Gram-positive granules—the other elements being scanty and consisting of some small Gram-positive and negative cocci, and a Gram-negative filament with Gram-positive exospores. (Fig. 1B.) Subculture on agar for 20 hours yielded a diffuse growth of minute pin-point grey translucent colonies, becoming confluent. Single colony examinations showed many Gram-positive large spores of varying shapes, a few small Gram-positive cocci, and one or two Gram-negative bacilli.

On further subculture the large spores were obtained practically pure, and on hanging drop in 2 per cent. glucose broth grew out at 37° C. in 16 days into branching filaments, containing and shedding the small coccal forms and having a variable Gram reaction.

A further 10 cultures were made from sputum; they were planted either with or without preliminary washing in sterile saline on the following media: (1) Matthews's medium[22]; (2) Levinthal's medium[23]; (3) Löffler's serum medium; (4) trypsinised serum-glucose agar; (5) agar; (6) 1/500,000 brilliant green agar.

Now, although Matthews's medium and Levinthal's medium are described as being especially suitable for the isolation of Pfeiffer's bacillus, in no case could I isolate it. I obtained single colonies which showed minute polar-staining, non-motile, Gram-negative bacilli, growing in chains and resembling Pfeiffer, but the colonies individually were never pure. They contained one or two Gram-positive coccal elements, and would grow on subculture on agar. Further, on subculture the Pfeiffer-like bacilli would often disappear—even when the subculture was made in Matthews's medium, and Gram-positive and negative coccal forms grow.

In another instance, in a case of broncho-pneumonia, with typical blood-stained sputum, the washed sputum was planted on Matthews's medium. After 24 hours' incubation at 37° C. a growth showing some minute colonies resembling those described for Pfeiffer was seen.

Examination of three of these showed in each case a mixture of Gram-positive cocci and a few Gram-negative bacilli, but no Pfeiffer's colonies were obtained. Case 90, which proved fatal on the fourteenth day of illness, showed on the eleventh day sputum thick, green, and purulent.

In films only Gram-negative, Pfeiffer-like bacilli were seen in enormous numbers, together with a few Gram-negative coccal clusters. It was planted on Matthews's medium and on trypsinised serum-glucose agar. After incubation at 37° C. for 24 hours, examination of individual colonies showed no Pfeiffer or even Pfeiffer-like bacilli—thus one single colony contained Gram-positive diplostreptococci, Gram-

negative cocci, Gram-positive large spores, and minute Gram-positive cocci.

The results of the sputum examinations were therefore as follows:—

Films showed organisms which appeared diagnostic of influenza—namely, hyphæ, large spores, small spores, coccal clusters and mulberry masses, diplostreptococci.

Cultures in no case yielded Pfeiffer's bacillus. A pure culture of large spores was obtained, which grew out into hyphæ, small spores, and coccal forms. Single colonies, even on subculture, were not pure, in that they did not contain only one organism.

An endeavour was then made to determine whether these organisms, as seen in the sputum in every case of influenza, occur in other respiratory diseases. Three cases of pulmonary tuberculosis with tubercle bacilli in the sputum, when stained by Gram's method, showed none of these forms.

Two or three cases of post-anæsthetic bronchitis have been examined with negative results, but the material from a sufficient number of definitely non-influenzal cases has not been available to make a certain statement on this point, which appears to be of considerable importance.

Examination of fæces.—Six cases of influenza that had attacks of acute enteritis during their illness were examined bacteriologically. They were passing liquid motions containing bright red blood. Specimens were collected on sterile swabs, and direct films stained by Gram's method. In all cases large spores, Gram-positive and Gram-negative, were seen. In addition there were coccal clusters of Gram-negative and Gram-positive elements, hyphal filaments, diplostreptococci, mulberry masses, and bacilli. In one case (No. 87) a 1/500,000 brilliant green agar plate was inoculated from a saline emulsion of the fæces. After 24 hours' incubation at 37° C. small raised, rounded, whitish pin-point colonies were seen.

A film made from one of these showed Gram-negative bacilli of varying lengths and Gram-negative filaments, and one of the filaments contained a Gram-positive spore in its substance. A subculture from this colony on Löffler's serum medium produced in 24 hours at 37° C. a pure culture of Gram-negative bacilli of varying lengths and a few filamentous forms, the culture being a uniform, raised glistening growth, whitish in colour, composed of minute colonies. This was subcultured in broth for 24 hours at 37° C., and produced a uniform turbidity of the medium. A film showed Gram-negative, short, rather plump bacilli, and no filamentous forms. An agar slope was inoculated; after 24 hours at 37° C. the colonies were circular, about 2 mm. in diameter, opaque, and grey.

The sugar reactions of this organism were as follows: Acid and gas were produced in lactose, glucose, mannite, and cane sugar. Milk became acid the first day, and remained acid with clot the second day. Gelatin was not liquefied. It was very slightly motile. A saline emulsion of the agar slope culture was made and found to give no agglutination in dilutions of 1/25 to 1/250 of the patient's serum taken during convalescence on the twelfth day of illness.

The organism appears to resemble closely the pneumobacillus of Friedländer, but did not form a nail-headed growth in slab cultures in gelatin. Further, it appeared pleomorphic, for on incubating the broth culture for 20 days at 37° C. Gram-positive large spores, small Gram-positive cocci, and minute Gram-negative cocci were found.

Urine cultures.—It is a comparatively common occurrence to find albumin, blood cells, or even casts present for a few days in the urine during an attack of influenza, but I have not seen any publication which describes positive results in urine cultures during the disease.

In my series seven cases of influenza were examined for the presence of organisms in the urine, and of these six were positive, giving a percentage of 86 per cent. positive results.

I performed these experiments at the suggestion of Captain Fry, who had previously obtained positive results in some cases. In every case the urine was drawn off under the most rigidly aseptic conditions by catheter into a sterile test-tube. 5 c.cm. were transferred to a sterile centrifuge tube and centrifugalised at high speed for 10 to 15 minutes. By means of a sterile pipette films were made from the deposit, and a broth tube and agar slope or Löffler slope were also inoculated. The urine and the cultures were then incubated at 37° C.

The results obtained may be expressed in Table VI.

TABLE VI.

No. of case.	Day of disease, temperature, and nature of case.	Urine deposit.	Duration of incubation of urine necessary before obtaining growth on subculture.	Primary subculture.	Later subcultures.
81	5th day. T. 98° to 99° F. Bronchitis.	No albumin, no cells, no casts. G. – bacilli with G. + tips; G. + cocci.	72 hours (Löffler).	G. + cocco-bacilli; G. + cocci; G. – threads.	Pfeiffer-like bacilli. G. + cocci; G. + large spores. Mucin.
83	4th day. T. 100° F. Bronchitis.	No albumin, a few epithelial cells. G. + cocco-bacilli.	Sterile.	Sterile.	Sterile.
85	5th day. T. 102° F. Bronchitis.	Trace of albumin, one or two red and white blood cells, one cast. G. – cocci; G. – bacilli.	48 hours (agar and Löffler).	G. + cocci; G. – cocci; G. – bacilli.	G. + cocci; G. + diplococci; G. + large spores. Mucin.
87	7th day. T. 99° F. Bronchitis.	No albumin, no cells or casts. G. + diplococci; few G. – diplococci.	24 hours (agar and Löffler).	G. + diplococci; G. + tetrads; G. – bacilli.	G. + cocci + small spores.
130	8th day. T. 100° to 101° F. Severe bronchitis.	Albumin present, no cells or casts. G. + small spores; G. – bacilli; G. – bacilli with G. + tips; G. – filaments.	18 hours (broth); 40 hours (agar).	G. + cocci; G. – small spores.	G. + diplostreptococci.
159	6th day. T. 100° F. Severe bronchitis.	No albumin, no cells. G. + large spores; G. – small spores.	Direct (broth).	G. + ovoid diplococcus; G. – hyphæ containing small spores; G. + filaments.	G. + ovoid diplostreptococcus.
170	10th day. T. 100° F. Bronchitis.	Much albumin, many red cells, few white cells. G. negative, large spores.	Direct (broth); 18 hours (agar).	G. + small spores; minute G. + diplococci; G. – large spores.	G. + diplostreptococcus. Few G. – cocci.

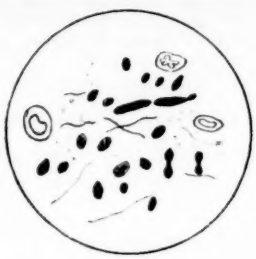
G. + = Gram +. G. – = Gram –.

Thus, whereas six out of seven urines gave a positive culture, not one gave a positive culture when placed direct (without previous incubation of the urine) on to a solid medium; but if the urine were incubated at 37° C. for from 18 to 72 hours subcultures were obtained in six cases. The two urines which were also put direct into broth gave a direct growth, but in these cases also the urine had to be incubated before a growth could be obtained on subculture on a solid medium. Further, it will be seen that from urines the following stages have been obtained: hyphæ, large spores, small spores, coccal clusters, tetrads, mulberry masses, diplostreptococci, and Gram-negative bacilli.

The sugar reactions of the cocci obtained from Cases 130, 159, and 170 were determined, and are shown in Table VII.

A control specimen of urine, removed with similar precautions from a healthy individual by catheter, remained sterile during incubation for a week, and would not grow on subculture.

Blood cultures.—These were made in 13 cases, and in one case a positive result was obtained, which is equivalent to 7·7 per cent. positive results. In each case the blood was removed by venipuncture, and received direct through a sterile needle with short rubber tube attached into the tubes containing the medium.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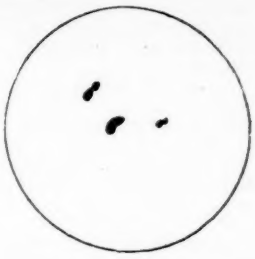
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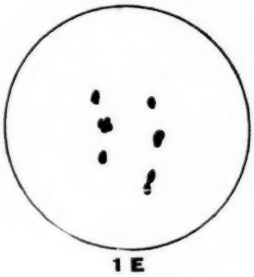
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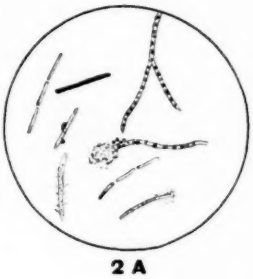
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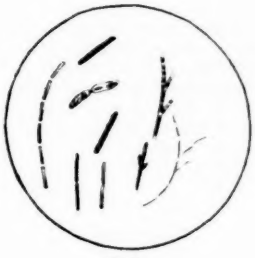
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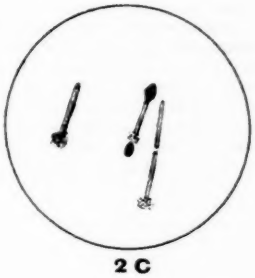
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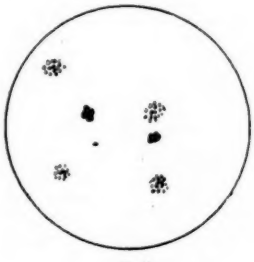
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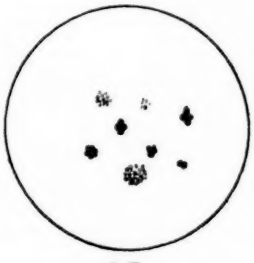
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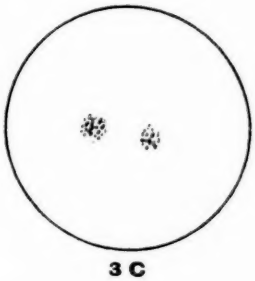
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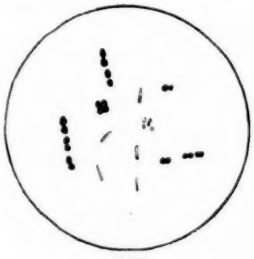
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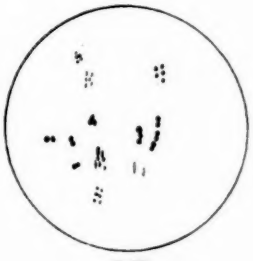
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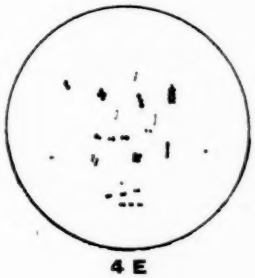
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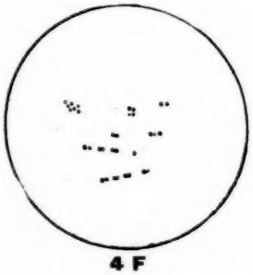
4 F

1. Large spores :—
   In A, sputum film ; B, sputum culture ; C, blood culture ; D, urine ; E, fæces.
2. Hyphæ :—
   In A, sputum film ; B, fæces ; C, culture from large spores.
3. Coccal clusters and mulberry masses :—
   In A, sputum film ; B, fæces ; C, urine.
4. Tetrads, cocci, bacilli :—
   In A, sputum film ; B, sputum culture ; C, fæces ; D, urine film ; E, urine culture ; F, blood culture.

TABLE VII.

No. of case.	Glucose.	Lactose.	Maltose.	Mannite.	Cane sugar.	Salicin.	Milk.	Gelatin.
130	Acid.	Acid.	Acid.	Nil.	Nil.	Nil.	Acid and clot.	Not liquefied.
159	,,	,,	,,	Acid.	,,	Acid.	,,	Liquefied.
170	,,	,,	,,	Acid (late).	,,	Nil.	Alk.	Not liquefied.

The media employed were: (1) Broth; (2) 2 per cent. glucose broth; (3) 4 per cent. maltose broth; (4) citrated broth; (5) sterile urine. The tubes contained 5 c.cm. of the medium, and an equal volume of blood was added to each. In two cases the blood was in addition received direct in a sterile tube before subcultures were made, and in one of these there was a positive result, the growth being obtained on serum-glucose agar from the broth subculture which had been incubated six days. Although in the other cases subcultures from the primary culture remained sterile, yet in 11 out of the 12 cases organisms were seen in the primary cultures after incubating for periods varying from 4 to 24 hours. The results are shown in Table VIII.:—

TABLE VIII.—*Blood Cultures.*

No of case.	Day of disease.	Temperature (Fah.).	Primary culture.	Subculture.
82	6th	99°–100°	G. – rods with G. + tips (broth).	Nil.
83	3rd	101°–102°	G. + granular bacilli; G. – bacilli (broth).	,,
83a	4th	101°	Nil (broth).	,,
84	5th	99°	G. – bacilli, G. + cocci (citrated broth); G. + small spores (urine).	,,
88	8th	103°–104°	G. + small spores; G. + cocco-bacilli and filaments; minute G. + coccal bodies (broth and glucose broth).	,,
89	9th	103°	Large G. + spores and hyphæ (glucose broth).	,,
90	,,	101°–102°	G. + cocci (glucose broth).	,, *
92	6th	100·8°	G. – large spores and hyphæ (glucose broth).	,,
96	9th	101°	G. + diplococci; G. – bacilli; G. + small spores (glucose broth).	,,
126	8th	103°	G. – cocci and bacilli; G. – large spores (glucose broth).	,,
135	7th	101°–102°	G. – large spores with G. + centre (incubated blood, glucose broth).	G. + diplococci in chains, † Nil.
181	4th	103°	G. + large spores and G. + cocci.	
197	9th	105°	G. – large spores.	,,

* But grew from blood later, when patient was bled.
† Agar and serum-glucose agar.

The subcultures from Case 135 grew equally well on agar and serum-glucose agar, in minute transparent dew-drop colonies, tending to become confluent.

The sugar reactions were as follows: Glucose, acid; lactose, acid; maltose, acid; mannite, nil; cane sugar, nil; salicin, nil; milk, alkaline; gelatin, not liquefied.

It therefore resembles very closely the coccus isolated from the urine in Case 170; the only difference being the late change produced in mannite in the urine coccus.

Primary cultures of blood show the following stages: Large spores, small spores, hyphæ, cocci in clusters, pairs and diplostreptococcal form, Gram-negative bacilli and Gram-negative bacilli with Gram-positive tips; and minute coccal forms which appear to be liberated from large spores, and which are approaching the limits of microscopic visibility.

There is difficulty in obtaining growth on subculture, but in one case the coccal form grew out, and had the same morphological appearance as that seen in urine and sputum, although the sugar reactions varied slightly.

Pleural Effusions.

Six cases were examined bacteriologically. Cells were scanty, a few small lymphocytes and polymorphonuclears being found in the deposit after centrifugalisation. Direct films showed a few Gram-negative bacilli, and in one case a pleomorphic variably Gram-staining organism of diplostreptococcal type. In no case was growth obtained on subculture. The organisms described above are illustrated in the accompanying figures.

1. *Large spores.*—In A, sputum film; B, sputum culture; C, blood culture; D, urine; E, fæces.
2. *Hyphæ.*—In A, sputum film; B, fæces; C, culture from large spores.
3. *Coccal clusters and mulberry masses.*—In A, sputum film; B, fæces; C, urine.
4. *Tetrads: cocci, bacilli.*—In A, sputum film; B, sputum culture; C, fæces; D, urine film; E, urine culture; F, blood culture.

Conclusions from Bacteriological Examinations.

Examination of material obtained from patients suffering from influenza has shown the presence of a mycotic organism.

It is possible that the disease is a mycosis—not necessarily in all cases a bronchomycosis, but perhaps in some an enteromycosis.

The originality of these findings belongs to Captain Fry, with whom I have performed experiments on animal inoculation and examination of material obtained post mortem in man.

Although the results obtained do not justify an assertion that influenza is a mycotic infection, they appear to demonstrate the fact that such an organism is present during the disease, and afford a means of unifying the seemingly discordant results that have been obtained by other workers.

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SANATORIUM TREATMENT AND MILITARY SERVICE:

AN ANALYSIS OF 47 CASES.

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THE following account of the adventures of a number of patients who had served in the various services during the war, after being treated in a sanatorium, may be of interest at the present time. It must not be supposed that this is the best which might be expected if the cases had been treated at an earlier date, for many of these cases were not very favourable, and in many symptoms had existed for prolonged periods before undergoing treatment, and the stage stated does not indicate necessarily the duration of symptoms, as some cases advance rapidly in a short time, whilst others go on for long periods before much apparent destruction has taken place. Most of these cases were volunteers in the true sense, for most of them could have procured exemption by obtaining a certificate. They did not ask my advice before enlisting; in some cases I should have attempted to dissuade them, and a number ought certainly to have been rejected. I think, however, it goes to show that were cases treated at sanatoriums as soon as symptoms became recognisable and were persistent, it would become unnecessary to reject

Pr. or Ab. = Presence (+) or absence (−) of tubercle bacilli: (1) on admission; (2) on discharge.

	Stage.	Year of admission.	Pr. or Ab. (1)	Pr. or Ab. (2)	Progress and particulars.
1	1st	1907	−	...	Enlisted 1915; 4 years France; demob., well and working at his trade.
2	1st	1909	−	...	Severely wounded, left to die; almost complete recovery from wounds, working at his old trade for two years.
3	2nd	1909	+	−	Still in the Army, well.
4	1st	1909	−	...	Untraced; probably should not have been taken.
5	2nd	1909	+	+	Engineer, Mercantile Marine; torpedoed Feb., 1917, 350 miles from land, 15 hrs. in open boat, no worse; killed by torpedo, April, 1917.
6	1st*	1910	−	...	Should not have been enlisted; demob.; working at his old trade.
7	2nd	1910	+	−	Three years France, sergeant; demob., well, working at his old trade.
8	1st	1910	−	...	Served in Salonika and India; demob.; working at his old trade.
9	2nd	1910	+	−	Two years in Army; demob., well, returned to his old trade.
10	1st	1910	+	−	Enlisted at latter end of war; demob. against his will, working at his old trade.
11	2nd	1910	(a)	...	Served in France until very severely gassed; readmitted; well, working at his old trade.
12	1st*	1910	−	...	Served from 1914 in Egypt and France, wounded; demob., working at his old trade.
13	1st	1911	−	...	Enlisted under age; discharged, working at his old trade.
14	2nd	1911	+	(b)	Another affection whilst in sanatorium, kept him in bed for weeks; served through war till severely wounded; well.
15	2nd	1911	+	−	Served some years in France; sergeant; readmitted; well.
16	2nd	1911	−	...	Served in Egypt; demob., well.
17	1st	1911	−	...	Served four years on home service; demob., well, and working at his old trade.
18	2nd	1911	−	...	Enlisted 1914. Very severe y wounded in France; well except for results of injuries.
19	1st	1912	−	...	Served from beginning of war, wounded twice, Egypt and France; well.
20	2nd	1912	+	−	Enlisted 1914. Wounded in France. Readmitted 1917; died in a few days from influenza.
21	2nd	1912	+	−	Enlisted 1914, served in Egypt, broke down after 2 years' service; readmitted, worked for a time; died from acute tuberculosis after short illness.
22	1st	1912	−	...	Still in Army, well.
23	1st	1913	+	−	Reservist, compelled to go to France; broke down. At present working.
24	1st	1913	+	(b)	Served throughout war in Navy. Torpedoed, 1917; 4 days in open boat. Malaria whilst in Red Sea. Jan., 1919, still in Navy and quite well.
25	1st	1913	−	...	Enlisted 1915; l.-corporal; at present demob., well, and working at his old trade.
26	1st	1913	−	...	Served in Egypt, Dardanelles, and France; demob., well, working at his old trade.
27	1st	1913	−	(c)	Enlisted early in war, corporal, gassed and badly wounded; demob., well but for wound trouble.
28	1st	1913	−	...	Served at home; demob., working at his old trade.
29	2nd	1914	−	...	Fought through earlier part of war in France, last heard of in military hospital.
30	2nd	1914	−	...	Enlisted 1916, still in France, well.
31	3rd	1914	−	...	Fought in France, broke down; in 1917 sent to Egypt, ship torpedoed, 4 hours in open boat; demob., well, and working at his old trade.
32	1st	1914	−	...	Still in Army, well.
33	3rd	1914	−	...	Enlisted April, 1916; blown up and buried; readmitted 1917, died from pulm. tuberculosis two days after leaving sanatorium.
34	1st	1914	−	...	Enlisted 1917, corporal; served in France. Demob. Jan., 1919. In excellent health.
35	2nd	1914	−	...	Served four years in Army; demob., well, and working at his old trade.
36	2nd	1914	−	...	Enlisted when not feeling well; died after two operations in military hospital. Advised to return to sanatorium instead of going into Army.
37	2nd	1914	−	...	Enlisted 1914; for 14 months in thickest of fighting in France; died of wounds in 1916.
38	2nd	1914	−	...	Enlisted 1915, corporal; after much fighting in France very severely wounded; now demob. and working at his old trade.
39	1st	1914	−	...	Enlisted at 18, served in Egypt and France; well.
40	2nd	1914	−	...	Enlisted in 1915, was five months in Army, discharged for other illness; working at his old trade ever since.
41	1st	1915	−	...	Remained in sanatorium a short time, returned to Army, soon after discharged; unsatisfactory case. Working when last heard of.
42	2nd	1915	+	+	Killed in France, 1917.
43	2nd	1915	−	...	Conscripted, should not have been taken; soon afterwards discharged, now labouring.
44	3rd†	1916	+	+	Conscripted, should not have been taken. Died in Army from influenza (?) 1918.
45	2nd	1916	−	...	Conscripted; keen to go, should not have been taken; served successfully for some months; broke down after influenza; readmitted.
46	2nd	1917	−	...	Only in Army a short time; readmitted and is now well; he could only be treated for 3 months when first in sanatorium.
47	1st	1915	−	...	Enlisted 1917; gassed in France; in hospital some months; quite well, working at his old trade.

* Acute. † Laryngeal. (a) Present before admission. (b) No sputum on discharge. (c) Reacted to tuberculin under treatment.

men on the ground that they had been in a sanatorium, and it follows from this that under ordinary peace conditions such patients would return to their former manner of life and old avocations. It should, of course, be understood that if passed as medically fit the country would have to take complete responsibility for their condition if they subsequently broke down. Had all sanatoriums spent their energies from their inception in treating early cases they might easily have produced a division of excellent soldiers; as it is, the majority of the patients treated in sanatoriums are either dead or hopelessly unfit, and are requiring after-care.

Analysis of Cases.

Except in certain cases which should not have been enlisted, it will be seen that the expense of treating these men for tuberculosis has not been excessive. All these cases were treated in the Ayrshire Sanatorium. I have only come across one case treated in the Ayrshire hospitals for advanced cases who enlisted, and he apparently made a bet that he would be taken, and he was passed Grade I. and saw some years' service in the East; he was finally invalided out of the Army with tuberculosis, and at the present time he is in fair condition.

The occupations of the above when admitted to the sanatorium were as follows: Coal-miners, 14; labourers, 6; schoolboys, 5; engineers, shop assistants, painters, iron moulders, and railway clerks, 2 of each; groom, bleacher, cabinet maker, iron turner, brass finisher, iron-stone miner, surfaceman, gardener, blacksmith, French polisher, mason, and agricultural labourer, 1 of each. One of these patients became a professional athlete after leaving the sanatorium, and is so engaged at the present time. One held a commission, another was offered a commission, 1 won the military medal, 1 was promoted on the field for valour, 2 were sergeants, and 3 were corporals. Three lost their lives in their country's service, 8 were wounded, 3 gassed, and 1 buried alive. One was discharged from the Army because he was said to be suffering from valvular disease of the heart; he really had heart failure due to excessive fibrosis, and should not have been taken. Another had suffered from caries in the spine; this man did home service right through the war, and is at present working at a laborious occupation. One man was discharged after an anti-enteric inoculation, and he has been working ever since. One was in hospital for some months, supposed to have pneumonia, but from the account he gave of himself he had evidently been suffering from an acute attack of tubercle; this is a mistake which is constantly being made, and is the cause of not a few incorrect death certificates. This man is now at his old work after seeing a good deal more of service. It will be noted that 14 had tubercle bacilli in their sputum, one reacted to tuberculin, and of those in whom bacilli were not found 12 were in the second stage and two in the third.

In closing I may remark that 28 had been in the sanatorium in 1913 or previous years, and had been engaged in their ordinary occupations for some time before war broke out. Finally, I would remark that the sacrifices of these men will not have been made in vain if they teach us that those who have had the misfortune to contract tuberculosis may be worthy of a better fate than to be segregated, but let it be understood there can be no worse place for an uncured tuberculous patient in war time than the Army.

LONDON HOSPITAL: OLD STUDENTS' DINNER.—The old students' dinner will be held on Thursday, Oct. 2nd, at Princes' Restaurant. Sir Bertrand Dawson will preside. This will be the first reunion of old students since the outbreak of the war. Application for tickets should be made to one of the honorary secretaries, Mr. Hunter Tod, 11, Upper Wimpole-street, W. 1, or Dr. Charles H. Miller, 32, Devonshire-place, W. 1.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON).—The following elections to scholarships have been made:—Burney Yeo scholarships: J. W. Hirst, Gonville and Caius College, Cambridge; C. F. T. East, New College, Oxford. Senior Scholarship and Todd prize: E. A. L. Crichlow, M.R.C.S., L.R.C.P. Jelf medal: H. Kamal, M.B., B.S., M.R.C.S., L.R.C.P. Tanner prize: Miss D. E. P. Jolly.

THE INCIDENCE OF TUBERCULOSIS AMONGST ASYLUM PATIENTS.

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AND
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COUNTY MEDICAL OFFICER OF HEALTH AND COUNTY TUBERCULOSIS OFFICER FOR HERTFORDSHIRE.

SINCE the commencement of the war there has been a marked increase in the prevalence of, and death-rate from, pulmonary tuberculosis. During 1917 the crude death-rate from this disease in England and Wales amongst civilians was 1250 per million population, compared with 1178 for 1916 and 1034 for 1912–14. The cause of this increase is to be attributed to the existence of conditions directly arising from the war which have impaired our resistance to attacks by the tubercle bacillus and which have favoured the spread of infection. Such conditions are to be found in prolonged mental anxiety and worry, physical exhaustion, depletion of the normal dietary, increase of the ratio of population per house, and departure generally from the normal pre-war standard of living. This increase in the incidence of pulmonary tuberculosis provides one significant lesson. It emphasises the fact that even under pre-war conditions the national reserve of resistance to attack by the tubercle bacillus was small and that any degree of security and the prospect of finally controlling tuberculosis can never be attained until the national reserve of resistance has been materially increased.

The increase in the incidence of pulmonary tuberculosis, which has been a feature of the last four years, is especially characteristic of the mentally abnormal population. Since 1914 there has been an increase of 41 per cent. in the deaths from tuberculosis in lunatic asylums. One of us has had the opportunity of studying tuberculosis amongst the insane for a period of over 30 years, and the marked increase in the death-rate from this disease since the commencement of the war amongst the inmates of a large asylum has been a cause of much thought and anxiety. It is obvious that the reserve of resistance to tuberculous infection in the insane and low-grade mentally defective person reaches a very low standard. In the following table are given the death-rates from tuberculosis during the last 20 years amongst the inmates of a large metropolitan asylum.

Death-rates from Tuberculosis during the last 20 years amongst the Inmates of a Metropolitan Asylum.

Year.	Average No. patients resident.	Deaths from all causes.	Mortality from tubercle—		Year.	Average No. patients resident.	Deaths from all causes.	Mortality from tubercle—	
			Deaths.	Rate per 1000				Deaths	Rate per 1000
1898	1986	193	55	27·6	1909	2069	210	70	33·8
1899	1952	250	73	37·4	1910	1911	120	31	16·2
1900	1905	310	104	54·6	1911	2049	144	38	18·5
1901	1772	164	67	37·8	1912	2068	129	41	19·8
1902	1768	134	43	23·8	1913	2051	197	59	29·0
1903	1752	131	34	19·4	1914	2099	172	42	20·0
1904	1751	158	53	30·2	1915	2045	240	70	34·2
1905	1776	126	44	24·7	1916	2041	283	102	49·9
1906	1782	127	40	22·4	1917	1941	459	141	72·6
1907	1819	151	37	20·3	1918	1769	542	208	117·6
1908	1920	156	39	20·3					

Note.—From the year 1900 onwards the diagnosis has been assured by post-mortem examination in more than 90 per cent. of cases.

From this table it will be seen that the death-rate from tuberculosis in 1914 was 20 per 1000, and that the rate has risen since that year to 117·6 per 1000 for 1918. The increase in the death-rate from tuberculosis amongst the inmates of asylums since the commencement of the war is remarkable, and is referred to by the Registrar-General in his annual report for 1917. In that report it is stated that 12 out of 97 county and county borough asylums were evacuated during the war in order that they might be devoted to military purposes, and this is stated by the Board of Control to have led to some degree of overcrowding. But, as is pointed out by the Registrar-General, this had much abated in 1917 from what it was in 1915, when the deaths from tuberculosis were far fewer. This fact is borne out by the table given above, for in 1914, when the average number of patients was 2099, the number of deaths from tuberculosis was only 42, whereas in 1918, when the average number of patients was only 1769, the number of deaths from this cause was 208.

Clinical Features.

One of the features of pulmonary tuberculosis is the variation in type which it presents, and the disease as it is found amongst the mentally abnormal population is a type by itself. In the great majority of cases the classical symptoms of the disease are absent. In walking through a ward reserved for the tuberculous insane one is at once struck by the almost entire absence of coughing. The same applies to sputum; the tuberculous insane patient has little or no expectoration for the twofold reason that the amount of sputum actually produced is less than in normal cases, and that any sputum which may exist is swallowed. Hæmoptysis is a rare symptom. The temperature shows very considerable variation. In certain cases the temperature during the latter stages of the disease presents the usual tuberculous type, but in many cases it is subnormal, even when marked pulmonary disease exists, and it is therefore not to be relied upon as a guide to diagnosis. In the non-tuberculous demented type of patient it is quite usual to have a subnormal temperature which rises to normal when tuberculosis develops. The most significant feature of pulmonary tuberculosis as it exists amongst the insane and mentally defective is the frequency with which gross pulmonary lesions exist without any corresponding physical signs to suggest the existence of such changes. This fact seriously complicates the question of diagnosis and provides room for doubt as to the accuracy of the statistical evidence of the incidence of tuberculosis in asylums, unless such evidence is based on post-mortem findings. The figures given in the present article are, for the most part, based on post-mortem evidence and, therefore, may be accepted as accurately representing the upward trend of asylum tuberculosis since the outbreak of war. The clinical picture of asylum tuberculosis may be briefly described as loss of flesh with progressive muscular wasting and weakness, and the onset of diarrhœa due to abdominal tuberculosis in a large percentage of cases.

Ætiological Factors.

The high attack-rate and death-rate from tuberculosis amongst the insane are due to fairly well-defined causes, some of which are preventable, others of which it is impossible to control. The first root cause is the lowered tissue resistance to attacks by the tubercle bacillus, which is characteristic of mentally abnormal persons, more especially the lower grade type such as idiots, imbeciles, and the demented. In the Leavesden Asylum the death-rate from tuberculosis has always been high, and one explanation of this high rate is the fertility of the existing soil owing to the low grade and hopeless type of patient which is admitted.

The large majority of patients admitted are in weak or very weak bodily health, and it has been rare to admit a man or woman capable of doing work. The type of case admitted may be gauged from the fact that it includes broken down senile cases, epileptics, demented general paralytics, demented drunkards, mental defectives, chiefly idiots and imbeciles and patients with advanced bodily disease or with serious physical defects. Patients of this type are unable to work or even to walk about. Their life is spent in bed or in sitting on a chair in the ward, with the result that they have shallow respiratory movements and sluggish circulation. This leads to imperfect lymphatic drainage of the lungs and predisposes to tuberculosis.

With reference to the relationship between the mental phase and tuberculosis it is apparent that certain types of mental abnormality exercise a greater influence in impairing the resistance to tuberculosis than others. A certain percentage of senile cases have become tuberculous in the asylum, although this is of rare occurrence outside. Thus of 326 senile cases which died during the five years ending Dec. 31st, 1918, 9 were found to be tuberculosis. According to Clouston, general paralytics never develop tuberculosis, but this has not been the experience at the Leavesden

Asylum. It should be mentioned, however, that all the general paralytics admitted to Leavesden Asylum are abnormal and most of them are of the demented type. Of 52 general paralytics dying during the five years ending Dec. 31st, 1918, 16 were found to be suffering from tuberculosis. Clouston also taught that patients with fixed delusions of suspicion and unseen agency always died of tuberculosis, while persons with grandiose delusions never died from this cause. The experience at Leavesden Asylum shows this to be wonderfully true. This fact is of interest and importance, as it sheds a suggestive light upon the possible ætiological relationship between the mental standard and capacity for muscular movement and tuberculosis.

The second important ætiological factor in the high death-rate from tuberculosis amongst the insane is contact infection. All the available clinical evidence is in favour of contact infection. It is true that insane tuberculous patients have rarely any expectoration, and therefore the medium of infection is obviously not sputum. The frequency of intestinal disease and the extent to which the hands, clothes, bed clothes, &c., are contaminated by fæcal matter point to the disease being conveyed through the medium of infected excreta. The following facts clearly indicate that many of the patients dying from tuberculosis have contracted the disease while resident in the asylum:—

	Male.	Female.	Total.
Patients found suffering from tuberculosis on admission during five years ending 1918 ...	31	12	43
Length of residence of patients dying from tuberculosis during 1918:—Under 1 year	18	8	26
,, 5 years	58	11	69
,, 10 ,, ...	45	13	58
,, 20 ,, ...	30	6	36
Over 20 ,, ...	17	2	19
Deaths from tuberculosis during 1918:—			
Tuberculosis (primary)	150	36	186
,, (secondary)	18	4	22
	168	40	208

Closely connected with the two primary ætiological factors is the question of the ventilation and heating of the wards. Generally speaking, the ventilation and air space provided are not sufficient to exercise any favourable influence in combating the marked predisposition on the part of mentally abnormal persons to the development of tuberculosis. While an abnormally low tissue resistance and the existence of contact infection are to be regarded as the primary causes of the high incidence of tuberculosis amongst the inmates of asylums compared with the mentally normal population, other factors have to be considered which are responsible for the marked increase which has resulted since the outbreak of war. The first and most important of these was the interference with the standard of feeding, more especially with regard to the amount of fats and sugar. Insane people require a diet rich in fats if their resistance to tuberculosis is to be maintained at a satisfactory level. Other contributory causes are the occurrence of outbreaks of influenza and pneumonia during 1917, and more especially in 1918, the weaker state of the patients admitted during the period referred to, the serious depletion of the skilled staff experienced in the management of the insane sick and the methods of prevention of disease, and the difficulty experienced in maintaining the cleanliness of the wards by painting and other means. The experience of the past four years has emphasised how extremely sensitive is the tuberculous index of the insane to unfavourable conditions.

The Diagnosis of Tuberculosis amongst the Insane.

The control of tuberculosis depends upon early recognition of the disease. The diagnosis of pulmonary tuberculosis as it is to be found amongst insane persons is a clinical problem of peculiar difficulty. In the majority of cases the disease develops and progresses without presenting any definite symptoms or physical signs, and it is not until the condition is revealed by post-mortem examination that the diagnosis of tuberculosis can be accurately made. As has been previously stated, the figures given in the present paper are based on post-mortem findings, and they may therefore be accepted as accurately representing the increase in the death-rate from tuberculosis in the lower grade of the mentally abnormal population during the war.

The most frequent and reliable indication of tuberculosis in the insane is progressive loss of weight with progressive muscular asthenia. The downward trend will, therefore, be speedily observed if all patients in asylums are carefully and regularly weighed. The next important indication is the onset of chronic diarrhœa, more especially if this follows a period of falling weight and failing strength. Conclusive evidence will be obtained by the bacteriological examination and the finding of the tubercle bacillus. Indeed, the more frequent examination of the excreta for tubercle bacilli would be a great aid to diagnosis and would, undoubtedly, reveal the fact that amongst the tuberculous insane the presence of the bacillus in the excreta is high compared with that in the tuberculous sane. The X ray examination of the chest would be of value in clearing up the diagnosis in certain types of cases, although its application might not always be an easy matter. The extent to which the various grades of tuberculous insane patients react to tuberculin, especially the cutireaction, is worthy of further investigation, but without such investigation it cannot be relied upon as of any assistance in confirming the diagnosis of tuberculosis. The question of diagnosis may be summed up by the statement that the majority of low-grade insane patients who die from wasting or chronic diarrhœa will be found on post-mortem examination to have been suffering from tuberculosis.

Prevention and Treatment.

In considering the measures to be adopted to prevent the spread of tuberculosis amongst the insane consideration at the onset must be given to the fact that we are dealing with a type of individual peculiarly susceptible to the development of the disease. It is necessary, therefore, that prophylactic measures should be directed towards maintaining the resistance of the insane patients to tuberculosis at as high a level as possible, and, secondly, to securing the segregation of tuberculous cases or of suspected tuberculous cases as early as is practicable so as to prevent the spread of infection. The resistance of the insane person to tuberculosis during residence in an asylum chiefly depends upon four factors—viz., exercise, ventilation, warmth, and the quantity and character of the diet. Physical exercise, or rather the lack of it, has a direct influence on the capacity of the body to resist tuberculosis, but the physical condition of many insane patients of the low-grade type precludes the possibility of any regular form of physical exercise. The amount of air space per non-tuberculous patient is laid down by the Local Government Board or the Board of Control, but it is obvious that, in view of the striking proclivity of the insane person to develop tuberculosis under certain conditions of asylum life, the amount of air space, and especially the extent of floor space, should be increased. Efficient ventilation with uniform efficient heating, conforming to some extent to a modified open-air regime, would appear to be necessary. The insane person, especially of the lower grade, is very sensitive to changes of temperature and has generally a poor circulation, and while a frequent change of air is essential a sustained uniform temperature is also necessary. A generous dietary with a liberal allowance of fats and sugar is of primary importance in raising resistance to tuberculosis. In common with the rest of the population the inmates of asylums have suffered during 1918 from interference with the normal scale of diet, and the adverse influence of the conditions arising from war would undoubtedly show itself earlier amongst persons of a mentally abnormal type.

With regard to treatment this consists for the most part of segregation in sanatorium blocks with a view to prophylaxis. It is extremely doubtful if the onward progress of tuberculosis to a fatal termination can be definitely arrested in a hopelessly insane or mentally defective person, although the progress of the disease may be very slow. Two special types of sanatorium wards should be provided, one for early cases immediately the disease is diagnosed and for suspected cases, and the other for advanced cases, especially those cases with evidence of intestinal tuberculosis. Cod-liver oil or one of its preparations in combination with creosote should be administered as a method of routine treatment. The development of tuberculosis in an insane person presents a tragic picture, and to visit a tuberculosis ward in a large asylum is an experience not easily forgotten. The question may, no doubt, be asked if it serves any useful or even

humanitarian purpose to endeavour to prolong the life of the tuberculous insane person. If this question were truthfully answered from the point of view of the economic value of the tuberculous insane, it would be answered in the negative, but as the aim of all medical effort is to relieve suffering and prolong life the insane person who develops tuberculosis must receive his due share of care and treatment.

Conclusions.

The conclusions to be drawn from a study of the incidence of tuberculosis amongst asylum patients are as follows:—

1. That the mentally abnormal person is, generally speaking, more liable to develop tuberculosis than the individual who is mentally normal.
2. That this liability is primarily due to predisposition dependent upon the mental condition.
3. That the determining factor in the spread of tuberculosis amongst the asylum patients is contact infection.
4. That contact infection amongst the mentally abnormal is frequently due to infected excreta.
5. That the increase in the prevalence of tuberculosis amongst asylum patients since the commencement of the war is due to the influence of a number of well-recognised factors arising from the war.
6. That in view of the extreme susceptibility on the part of asylum patients to develop tuberculosis it is essential that increased efforts should be made to provide such conditions of asylum life as will tend to counteract such susceptibility.

THE PRIMARY TOXIC EFFECT OF NEOSALVARSAN.

BY PROFESSOR K. PETRÉN.

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IT has been difficult from clinical observations to decide the question, what toxic effects salvarsan produces. We know well that a very great number of observations have been published in which morbid symptoms have occurred after the injection of salvarsan; these symptoms have often been of a very serious character, and Matzenauer reported in 1916 that about 200 fatal cases of intoxication by salvarsan have been published. The symptoms which have been observed as a consequence of the injection of salvarsan have been very various in the different cases; one can, however, say that they all are localised to the nervous system, but otherwise they are described as very different.

A "Toxic Storm."

As regards the causes of the morbid symptoms from the nervous system which we can observe after injection of salvarsan, it is generally recognised that one must always take into consideration the possibility that they may be a consequence of the biological interaction between the human organism and the micro-organisms of syphilis—as the experience of the effects of salvarsan has almost exclusively been obtained from observations of patients suffering from syphilis. Many authors have accepted the suggestion that these symptoms from the nervous system, to a very great extent, are due to a "toxic storm"—that is to say, that they suppose a very great number of the micro-organisms of syphilis have been suddenly killed through the effects of salvarsan, which has resulted in a large amount of toxin suddenly becoming free in the blood.

The grounds which speak for such an interpretation of the salvarsan poisoning are, indeed, very strong. As a consequence, we can never come to very definite conclusions as to what are the real toxic effects of salvarsan itself, so long as our experience is confined to patients suffering from syphilis.

Neosalvarsan in Influenza-pneumonia.

During the great epidemic of influenza from which every country in the world has suffered during the last year I have had the opportunity of observing the effects of the injection of salvarsan in individuals not suffering from syphilis, as I have tried to treat the influenza-pneumonia with neosalvarsan. In this paper I shall not enter upon the question as to the effects of this treatment on the pneumonia itself. (I hope that I shall find occasion shortly in another medical paper in the English language to treat of this question among a number of others relating to my experience of influenza-pneumonia.) Here I will only speak of the toxic effect which I have observed as a consequence of the injection of (neo) salvarsan.

In a great number of cases of influenza-pneumonia (about 140) we have given injections of neosalvarsan. In almost every case we injected 0·60 g. (in my first cases only we tried a smaller dose), but having seen no harmful effect follow these smaller doses we had at once progressed to the doses of 0·60, and thereafter regularly continued with the large doses.

In by far the greater number of cases we have not seen any toxic effect whatever. In some few cases, however, we have seen a special effect of the injection, inasmuch as the injection has been followed by vomiting. In some of these cases the vomiting occurred only once; in other cases two or three times, or perhaps sometimes even oftener. This pathological occurrence has quite regularly shown the following characters. The vomiting has appeared during the first 24 hours following the injection—only during this period and never later. The patients have not shown any other signs of dyspeptic troubles. After the lapse of 24 hours no disturbance of the stomach has occurred. Practically all the patients suffering from influenza-pneumonia—and I lay special stress upon this—have been treated with digitalis, either with drug or with digitotal (a preparation which approximately corresponds to digalen). When I first saw these cases of vomiting I did not venture to give them digitalis for the next few days, but after having found that the patients to whom I had given digitalis after two or three days tolerated it with no more difficulty than other patients, I began later to give even these patients digitalis in the cases with vomiting, when the first day had passed, in other cases also during the first 24 hours after the injection.

Vomiting after the injection of salvarsan we have seen in a great number of cases of pneumonia among women. For a time I did not observe the occurrence among men, but later I saw it in four cases of men; for three of these cases the body weight was determined 53 kg. (19 years), 53·5 kg. (28 years), and 57 kg. (17 years); the fourth patient was a man of 24 years and was not a person of great weight. Otherwise we have not seen the least toxic trouble after the injection of neosalvarsan. We have never seen albuminuria when the patients had not shown it before the injection, and in those cases where they had albuminuria before the injection we have never observed that it had increased as a consequence of the injection. Also the microscopical examination of the urine has never shown an increase of the sediment as a consequence of the injection. We have never seen headache, vertigo, or other symptoms from the nervous system—with exception of the vomiting—after the injection.

Conclusions.

From the foregoing description we find that the toxic effect after the injection of salvarsan was quite monosymptomatic, and that the only toxic effect, when it occurred at all, followed fixed laws, as its occurrence was limited to a fixed period after the injection and was also to a certain degree dependent on the weight of the individual that had received the injection.

When we take these circumstances into consideration it seems unnecessary to discuss the question where the injected salvarsan exercises its effects, as it is quite manifest that a morbid phenomenon of this regular character and of this short duration (with no exception from the rule that the vomiting occurs *only* during the first 24 hours after the injection) cannot be the consequence of a local effect exercised on the stomach wall, but must be *the effect of the poison on the centre of vomiting in the bulb.*

In consequence, thanks to the circumstance that my observations on the effect of the injection of salvarsan are uncomplicated, in the sense that they are free from the disturbing influence of the biological effect exercised by salvarsan on the micro-organism of syphilis, and thanks to the fact that these observations are of sufficiently great number to lead to the deduction that the phenomena produced are governed by certain laws, we come to the conclusion that the first toxic effect of salvarsan (neosalvarsan) on man can be demonstrated with the certainty of an experiment on animals, and that this toxic effect consists in a strictly elective effect produced exclusively on the centre of vomiting in the medulla oblongata.

FURTHER REPORT ON THE

TREATMENT OF SCIATICA

BY RADIANT HEAT AND STATIC WAVES.

BY JOHN J. GRACE, F.R.C.S. ENG.,

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SOME years ago I published[1] a short report on the treatment of sciatica by radiant heat and the static wave current. In the interval I have treated some 70 cases, and the results obtained are instructive.

So far as has been possible I have differentiated between sciatica and pain in the sciatic distribution due to osteo-arthritis of the hip-joint, or of the sacro-iliac-joint, but this distinction is not always possible, and perhaps some of the unrelieved cases are of this nature. Of the 70 treated, 59 were cured or relieved of the pain to such a degree that they could pursue their usual avocations in comfort. If it be taken into consideration that I do not see mild or early cases of sciatica, practically all being referred cases in which other forms of treatment have failed, I think the results shown in the table are very good. The term recovery as used in the table means complete recovery, and "no improvement" is the expression of my opinion. The other terms are taken from the patients.

The treatment is painless, except to those few people to whom all electricity is painful. One of these patients is included in the above list, and though she hated the treatment she persisted to a triumphant, though belated, conclusion. No exposure is involved, though the electrode must be applied to the bare skin, and finally no harm is done in the event of failure.

No. of Case.	Sex.	Age.	Duration.	No. of treatments.	Result.
1	M.	19	4 m.	11	Recovery.
2	M.	32	3 w.	—	,,
3	M.	34	1 y.	12 S.w.; 6 X-ray.	No improvement.
4	M.	34	6 w.	13	Recovery.
5	F.	35	4 y.	19	,,
6	M.	35	11 m.	N.r.	Improvement (could play golf).
7	M.	35	3 w.	26	Almost well, a little stiff.
8	M.	36	4 w.	N.r.	Recovery.
9	F.	36	4 m.	,,	,,
10	M.	36	4 w.	11	,,
11	M.	37	9 m.	—	No improvement.
12	M.	37	2 m.	12	Much better.
13	M.	38	1 y.	16	Very much better.
14	M.	40	5 d.	4	Recovery.
15	M.	41	6 m.	12	,,
16	M.	44	4 y.	4	,,
17	M.	45	1 m.	10	,,
18	M.	46	5 m.	—	,,
19	M.	47	6 m.	—	No improvement.
20	M.	47	2 w.	6 X-ray.	Very much better.
21	M.	48	5 m.	12	Complete recovery.
22	M.	49	1 w.	10	Recovery.
23	M.	50	14 w.	14	,,
24	M.	50	(see below*)	10	,,
25	M.	50	1 w.	N.r.	,,
26	M.	50	5 m.	89	,,
27	M.	52	1 d.	7	,,
28	M.	53	10 d.	N.r.	,,
29	M.	53	14 y.	10	No improvement.
30	M.	53	2 y.	25	Recovery.
31	M	54	6 m.	N.r.	,,
32	M.	55	2 w.	4	,,
33	M.	56	N.r.	8	,,
34	M.	57	4 m.	18	,,
35	M.	57	1 m.	N.r.	,,
36	F.	58	5 d.	N.r.	Recovery.
37	M.	58	N.r.	4	Very much better.
38	M.	59	(see below†)	13	Not much better.
39	M.	60	1 y.	—	No improvement.
40	M.	62	4 m.	15	Very much better.
41	M.	62	2 w.	12	,,
42	M.	70	2 w.	21	Recovery.
43	F.	70	2 m.	8	Great improvement.
44	M.	71	2 d.	12	Recovery.
45	M.	75	N.r.	N.r.	Very much better.
46	M.	77	4 m.	,,	Improved.
47	M.	88	5 m.	4	Very much better.
48	M.	N.r.	Some w.	N.r.	Recovery.
49	M.	,,	1 w.	8	Much better.
50	F.	,,	5m. on & off.	5	,,
51	M.	,,	Few m.	8	Almost well.
52	M.	,,	3 m.	12	Recovery.
53	F.	,,	5 m.	24	,,
54	M.	,,	3 w.	4	,,
55	F.	,,	3 m.	10	,,
56	F.	,,	4 w.	11	,,
57	F.	,,	6 w.	6	,,
58	F.	,,	2 y.	6	,,
59	F.	,,	1 y.	N r.	Practically well.
60	F.	,,	About 2 w.	9	Recovery.
61	F.	,,	2 d.	2	,,
62	M.	,,	3 m.	N.r.	No improvement.
63	F.	,,	6 m.	12	,,
64	F.	,,	5 m.	9	,,
65	M.	,,	10 m.	S.w., n.r., 13 X-ray.	Improved, but not well.
66	F.	,,	10 m.	9	No improvement.
67	M.	,,	11 m.	14	,,
68	F.	,,	1 y.	N.r.	Recovery.
69	M.	,,	9 m.	10	Practically well.
70	F.	,,	1 y.	6	Very much better.

* An attack every 3 years for 11 years. † 10 years' history of pain in legs; doubtful osteo-arthritis. N.r., not recorded; S.w., static wave; d., days; w., weeks; m., months; y., years.

Remarks.

CASE 3.—Relapse during military service.

CASE 5.—Had spent 8 months in bed.

CASE 7.—This case was remarkable for its severity, and though the present attack was of short duration he had had a previous severe and prolonged attack. The usual treatment by the static wave with an electrode 6″ × 4″ applied over the gluteal region from behind the trochanter up towards the sacrum having failed to relieve, I examined the prostate, which was enlarged and tender. Treatment of this with a rectal electrode produced almost immediate relief of the sciatica and markedly reduced the size of the prostate.

CASE 10.—Much better after five, then relapse, and bed for a week. Then six more treatments.

CASE 13.—This man was buried by a shell explosion in 1914. When dug out his thigh was bent back so that his heel was against his back. Pain in the sciatic distribution was constant. He left much improved and free from pain after 16 treatments. The peroneal group of muscles were partially paralysed.

CASE 15.—Was blown up by a shell, and sciatica started immediately. Had had various treatments by electricity and massage before he came to me.

CASE 16.—Had been prisoner of war and had had no treatment.

CASE 18.—Present attack had lasted five months. When first seen he had marked scoliosis. He walked with great difficulty, with the aid of a stick, on the toes of his left foot. Could bear no weight at all on the leg. Pain very severe and continuous. In six weeks the pain was slight, but the scoliosis remained. Two months later he was quite straight and could walk well.

CASE 20.—Was treated with the X ray only, as the static wave current did not appear to benefit him.

CASE 21.—This patient's sciatica was relieved after 12 treatments. Attention was then directed to lumbago, from which he had suffered for eight years. This, too, got quite well.

CASE 23.—This patient improved steadily for ten treatments; then improvement ceased. The prostate was examined and found slightly enlarged. After four treatments to this he got quite well.

CASE 29.—Patient discontinued treatment.

CASE 31.—Returned 2 years later with recurrence which got well, and again 1 year later.

CASE 37.—Had to return to trenches (very pleased).

CASE 43.—High blood pressure 210 mm. reduced to 165 by auto-condensation.

CASE 47.—Discontinued owing to gout in knee.

CASE 49.—Had to stop treatment. Was a soldier under orders.

CASES 60 and 61.—Same patient, different attacks and sides.

CASE 62.—Got practically well. Went for a long walk, relapsed, and did not again improve.

CASE 63.—Recovered after operation for piles.

CASE 67.—Sciatica followed wound of thigh.

CASE 70.—Discontinued owing to death in family.

Welbeck-street, W.

[1] THE LANCET, Jan. 10th, 1914.

INTRAVENOUS INJECTIONS OF ANTIMONIUM TARTARATUM (TARTAR EMETIC) IN BILHARZIASIS.

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OWING to the recent important advances in our knowledge of bilharziasis much attention has been attracted to this condition. These advances are chiefly due to the work of Leiper, Fairley, and Christopherson.

Summary of Recent Advances.

In 1915 Leiper[1] worked out the complete cycle of development of the bilharzial worms, giving a connected story of their life-history. He found the non-eyed, bifid-tailed cercariæ characteristic of the genus in two genera of snails, *Bullinus contortus* and *Planorbis boissyi*. These snails were shown to harbour two different species—*Bilharzia hæmatobia*, characterised by a terminal-spined ovum, and *Bilharzia mansoni*, characterised by a lateral-spined ovum.

Fairley's[2 3] work demonstrated how bilharzial parasites and their ova exert a deleterious influence on the tissues of their *definitive* host, man, mainly by the production of toxins, and not merely mechanically. These toxins call into action cellulo-humeral responses which neutralise or limit their activity. As a result immune bodies, including complement-fixing substances, are produced, and a complement-fixation test for bilharziasis has been devised by Fairley comparable to the Wassermann test for syphilis. As antigen an alcoholic extract of the infected livers of snails (*P. boissyi*) was employed. Positive complement-fixation was obtained in a high percentage of cases in man as well as in experimentally infected monkeys. The practical application of this test, Fairley considers, will facilitate the diagnosis of bilharziasis in the early stages of the disease before localising symptoms have developed, and also in estimating the effect of the intravenous administration of drugs on the adult parasites.

Christopherson[4 5] introduced, or independently re-introduced, the administration of intravenous injections of solutions of tartarated antimony (tartar emetic) with success, and claims that this method constitutes a specific cure for the disease. It was the satisfactory results obtained by himself and others by this method in Oriental sore, internal leishmaniasis, and naso-oral leishmaniasis (espundia) as found in the Sudan which induced Christopherson to apply it in bilharziasis, vesical and rectal. This method was commenced by him in the Khartoum Civil Hospital in May, 1917. In September, 1918, he recorded 13 cases of *Schistosomum hæmatobium* treated by this method with apparently complete cure in all the cases, but with relapses in from one to eight months in three cases. As the result of his experience he considers that there is no doubt that antimony given as intravenous injections of tartar emetic considerably interferes with the bilharzia and suspends its activities, even when it does not actually kill. His own opinion, based on the cases treated during the last year, is that antimony (antimony tartrate) is a definite cure for bilharziasis, and that intravenous injections of tartar emetic kill the *Schistosomum hæmatobium* in the blood and render it harmless.

Christopherson's method consisted in giving a course of injections on alternate days for a period of 15 to 30 days, commencing with ½ gr. dissolved in 6 c.cm. of distilled water and increasing by ½ gr. up to 2 gr. until a total of 30 gr. have been injected. This amount he considers to be the required killing dose, notwithstanding that all the symptoms of the disease often completely disappear after the first or second injection.

Series of Cases.

The following ten cases of vesical bilharziasis have recently been treated by this method at the Bermondsey Military Hospital:—

CASE 1.—Pte. C. Admitted to the Bermondsey Military Hospital on Sept. 21st, 1918, having been transferred to England from Egypt for bilharziasis. Blood first noticed in urine in August, 1916. Much blood and many terminal-spined bilharzia ova found in urine. Had 17 injections of tartar emetic intravenously, 29½ gr. being given. Stiffness of neck and shoulder muscles after injection. Discharged well Dec. 12th, 1918.

CASE 2.—Pte. T., aged 27. Admitted Sept. 21st, 1918. Transferred to England from Egypt for bilharziasis. Complained of hæmaturia and abdominal pain in July, 1918, having been stationed in the Fayoum District for 13 months. Albumin, blood, and terminal-spined bilharzia ova found in urine. Ten intravenous injections with a total of 21½ gr. of tartar emetic. No further blood or ova in urine. Discharged well Jan. 20th, 1919.

CASE 3.—Cpl. B., aged 29. Admitted Sept. 21st, 1918, having been transferred to England from Egypt for bilharziasis. Was in the Fayoum District in 1915–16, where he developed hæmaturia with dysuria and hypogastric pain. Albumin, blood, and terminal-spined bilharzia ova found in urine. 27½ gr. tartar emetic injected intravenously. Cough and irritation of the throat after each injection, and vomiting after one injection. Blood and ova not again found in urine. Discharged well Dec. 18th, 1918.

CASE 4.—Spr. S., aged 39. Admitted Sept. 21st, 1918. Went to Egypt December, 1915. Began to pass blood and clots in urine in November, 1916. Complained of hæmaturia and burning sensation at end of micturition with general weakness, wasting, and anæmia. Weight had fallen from 14 st. to 10 st. 7 lb. Terminal-spined bilharzia ova, red blood cells, and a little albumin in urine. 27½ gr. tartar emetic given intravenously in 17 injections. Complained after various injections of irritation in the throat, with tickling cough, nausea, vomiting, diarrhœa, and stiffness of muscles of neck and shoulders. Blood and ova not again found in urine. Discharged well Dec. 4th, 1918.

CASE 5.—Pte. L., aged 22. Admitted Sept. 8th, 1918. Had been in Egypt since April, 1916. Hæmaturia commenced in January, 1917. Bilharzia ova found in urine in Egypt, but not in England, though albumin and blood were present. 22½ gr. tartar emetic injected. Rigor, pyrexia (103°), nausea, vomiting, and pain in the body after injections. Discharged fairly fit and free from bladder symptoms Dec. 19th, 1918.

CASE 6.—Pte. M., aged 21. Admitted Sept. 21st, 1918. Sent direct from Egypt, where he had been since December, 1915. Hæmaturia commenced May, 1916. Urine showed a trace of albumin and abundance of red blood cells and terminal-spined bilharzia ova. 30½ gr. tartar emetic injected. Symptoms produced were immediate cough, giddiness, vomiting, slight diarrhœa, and stiffness in shoulder muscles. Blood and ova not found again. Discharged well Dec. 19th, 1918.

CASE 7.—L cpl. D., aged 22. Admitted Sept. 9th, 1918. Went to Egypt November, 1915. Hæmaturia first observed at Fayoum October, 1916. Urine contained terminal-spined bilharzia ova, red blood cells, and a trace of albumin. Sixteen injections (29 gr.) tartar emetic. No ova after completion of injections. Weight increased from 10 st. 7 lb. to 11 st. 4½ lb. Discharged well, except for a little weakness.

CASE 8.—Pte. G., aged 25. Admitted Jan. 17th, 1919. Sent direct from Egypt for bilharziasis. Was infected in the Fayoum District 1915–16. Blood cells and terminal-spined bilharzia ova abundant in urine. 31½ gr. tartar emetic injected. Pyrexia (100°) and general pruritus occurred after two injections. No further blood or ova. Discharged well.

CASE 9.—Cpl. M., aged 30. Admitted Oct. 12th, 1918. Sent direct from Egypt for bilharziasis. Blood and terminal-spined bilharzia ova found in urine. 30 gr. tartar emetic injected. Irritative cough and headache after injections. No more blood or ova in urine. Discharged free from bladder symptoms, though still has slight dull pain in small of back, and patient considers he is weaker and more easily tired than before injections.

CASE 10.—Pte. C., aged 25. Admitted Nov. 12th, 1918. Was perfectly fit until sent to Egypt in September, 1915. Was stationed in the Fayoum Province until November, 1916, when he was sent to Palestine, where the hæmaturia commenced. Bilharzia ova found in urine. 30½ gr. tartar emetic injected. At the end of the course of injections the urine was free from ova, blood, and albumin, but patient still complained of pains in the back and over the bladder. During the following week there was a recurrence of the hæmaturia, with headache and more pain on micturition. The urine contained red blood cells and granular epithelial cells, but no ova were found. Patient was transferred to the 4th London General Hospital.

Results.

In all these cases the solutions used were made by dissolving the tartar emetic in freshly distilled sterile water, 1 gr. in 6 c.cm., and then sterilised by autoclaving for one hour. At first the injections were administered every two days, with a maximum dose of 2 gr., whilst on the later cases I worked up to doses of 3 gr. twice a week. No serious drawback, no marked toxic manifestations, and no severe reactions followed the injections. With one exception all

the patients were troubled with irritation of the pharynx and a spasmodic outburst of coughing either during or after the injections, usually just at the end of administration. In four cases stiffness and cramp of the muscles of the neck and shoulder girdle were complained of. Gastro-intestinal symptoms were fairly frequent, comprising nausea in 3 cases, vomiting (usually once only) in 4 cases, and slight diarrhœa in 3 cases. Headache was noted in 2 cases. There was induration at the seat of injection in 2 cases. Pyrexia (to 103° F.), slight giddiness, pains in the body, general pruritus, and loss of weight were noticed in 1 case each.

Untoward Effects of the Injections.

	Cases.		Cases.
Cough and pharyngeal irritation	9	Induration	2
Stiffness of neck and shoulder muscles	4	Pyrexia (to 103° F.)	1
Nausea	3	Giddiness (slight)	1
Vomiting (slight)	4	Pains in the body	1
Diarrhœa (slight)	3	General pruritus	1
Headache	2	Loss of weight	1
		Relapse of hæmaturia	1

The immediate results were very striking and comprised a rapid disappearance of the blood and ova from the urine, disappearance or mitigation of the hypogastric and perineal pains and pain in micturition, improvement in anæmia, gain of weight, and a quite striking improvement in general appearance and feeling of well-being. The remote results I am unable to discuss owing to the short time elapsed and to the fact that all the patients have left the hospital. As far as is known all the cases have remained free from symptoms except Case 10, who developed a smart hæmaturia within a week of completing the course of injections; no ova could be discovered on microscopic examination of his urine.

Case 3 was so pleased that he writes from the country under date Dec. 22nd, 1918:—

"The hæmorrhage has completely stopped, and bar a little pain in the affected region I am practically fit" (although he states elsewhere his duties are not of a very light character). "There are one or two fellows here who are discharged with bilharzia and have had no treatment whatever. They are naturally anxious to undergo this particular treatment. I should be greatly obliged if you could inform me as to the course they should adopt to obtain it."

That tartar emetic injected intravenously exerts a strikingly beneficial effect on vesical bilharziasis is amply demonstrated by the cases here recorded, but how this effect is produced is not so evident. That the drug kills or inhibits the activity of the parasite appears the most reasonable suggestion. At what stage in the life history of the parasite this occurs, whether ovum, miracidium, or adult worm, or all three, has not yet been demonstrated. Christopherson claims that the tartar emetic exerts a direct helminthicidal action on the adult worm. Direct experimental proof on this point is still lacking, though Archibald and Innes's case, the only one so far submitted to post-mortem examination, provides some support for this view.

The Toxicity of Tartar Emetic.

The high toxicity of tartar emetic has always been a matter of serious concern to those employing it in intravenous injections, especially in the intensive manner now prevailing for the treatment of bilharziasis, trypanosomiasis, and leishmaniasis. That such injections are not free from risk is shown by Knowles[6] and by Archibald and Innes.[7] The former recorded 5 deaths out of 20 cases of kala-azar treated by tartar emetic, whilst the latter record a fatal case of bilharzia so treated.

The case of Archibald and Innes was a strong Egyptian soldier suffering from hæmaturia, whose urine showed a heavy infection with terminal-spined ova of bilharzia. The solution employed for intravenous injection contained 1 gr. of the drug dissolved in 2 c.cm. of sterile water, being mixed immediately before use with an equal amount of sterile normal saline solution. The initial dose was ½ gr., gradually increasing to a maximum of 2 gr., until a total of 33 gr. were given, the injections being given every second day. At the end of the treatment the urine contained blood, but no ova. The patient then developed influenza, and died on the fourth day of the illness from broncho-pneumonia. At the autopsy no adult worms could be found, though the congested mucous membrane of the bladder contained large numbers of bilharzial ova. The liver and kidney cells and the tunica intima of the inferior vena cava showed fatty degeneration and fatty infiltration, changes which were attributed to the action of tartar emetic, and were not sequels of bilharzia, influenza, or a previous malarial infection.

This opinion of Archibald and Innes appears correct, as somewhat similar changes are found in the liver in certain toxic conditions, especially in the closely allied conditions of arsenic and phosphorus poisoning, and as was found by Gregorson and Taylor[8] in trinitrotoluol poisoning. The toxins attributed to the ova and miracidia of bilharzia by two Japanese observers, Kiyono and Murakami,[9] do not appear to produce fatty changes in the liver, but lead to a cirrhotic condition of that organ.

Although in Archibald and Innes's case the cause of death appears to have been influenzal broncho-pneumonia the degenerative changes in the liver and kidneys may have been recoverable, or may have been due to undue susceptibility of the patient to antimony. That very much larger doses of tartar emetic can be given intravenously with perfect safety is evident by a case under the care of Dr. C. W. Daniels, treated by Dr. H. B. Newham, C.M.G.,[10] at the Seamen's Branch Hospital attached to the London School of Tropical Medicine.

This was a patient infected with *Trypanosome rhodesiense*, who received 236 bi-weekly intravenous injections of tartar emetic in the course of two and a half years. The maximum dose was 2½ gr., and the total quantity administered amounted to the enormous total of 550 gr. The patience of the physician and the fortitude of the patient were finally rewarded by the complete recovery of the patient from the most virulent of all the forms of trypanosomiasis, and the patient remains free from symptoms both of the disease and of antimony poisoning until the present day.

Less Toxic Compounds of Antimony.

Since the risks of antimony poisoning as the result of intravenous injections, though apparently not very great, cannot be ignored, other forms of antimony should be sought combining equal therapeutic effects with diminished toxicity. Antimony and arsenic are so closely allied in their chemical characters that this condition would probably be brought about by the production of organic compounds of antimony. Since antimony and arsenic are so closely allied in their chemical characters and the toxicity of arsenic has been greatly reduced without diminishing its therapeutic action by introducing arsenic in organic combinations in such drugs as salvarsan and its substitutes, it would appear highly probable that similar organic compounds of antimony could be produced and that the effects of the antimony would be similarly influenced.

In view of the prevalence of trypanosomiasis, leishmaniasis, and bilharziasis in various parts of the world and the undoubted beneficial action of antimony compounds on these diseases, the production or thorough investigation of such organic compounds of antimony is one of the pressing problems of the day in tropical medicine.

Meanwhile Sir Leonard Rogers[11] has drawn attention to the occasional danger from the toxicity of tartar emetic intravenously, and has done the pioneer work in searching for equally efficient but less toxic forms of antimony. In 1916 he recommended sodium antimony tartrate, Plimmer's salt. More recently he has employed colloid antimony sulphide intravenously in kala-azar. He found it effective in smaller doses, being retained in the blood longer than the soluble tartrates of antimony, and concludes that colloid antimony sulphide appears a distinct advance on soluble antimony tartrates. It is evident that colloid antimony sulphide given intravenously would be well worth trying in bilharziasis.

I am indebted to Lieutenant-Colonel Marett Tims, R.A.M.C., Officer Commanding the Bermondsey Military Hospital, for permission to publish these cases, and to Captain F. Talbot, R.A.M.C., and Drs. R. H. Townend, J. Howard Cook, A. M. Cato, and A. E. Wilson, for permission to use the cases under their care.

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(Continued at foot of next page.)

SUPPLEMENTARY NOTE ON JAUNDICE AMONG THE BRITISH TROOPS IN NORTHERN ITALY.

THE following is an addendum to the article under the above heading by Dr. H. H. TOOTH and Dr. E. G. PRINGLE which appeared in THE LANCET of July 26th, 1919 :—

Addendum.

Lieut.-Colonel A. E. Gates, consulting physician at the forward area at the time when our cases were recorded, has kindly allowed us to include abstracts of notes of four cases, two of which were fatal but presented no evidence of spirochætosis. But the blood of the two that recovered grew spirochætes in guinea-pigs. The cases were briefly as follows :—

1. Pte. B. Onset sudden, Sept. 2nd, 1918, with headache and general illness. On the 6th, vomiting; 7th, admitted to hospital. Marked jaundice, conjunctivæ injected. 8th, impaired resonance and moist sounds in right lung posteriorly. 10th, copious pasty motions with much blood clot. 13th, died. Low grade of fever 99°–100°, rising to 102° on day of death. Sputum, no influenza bacilli, predominant organisms pneumococci. Post-mortem : Confluent broncho-pneumonia lower lobe of right lung, discrete and hæmorrhagic of left. Gall-bladder distended with thick dark bile, common duct occluded by blood clot. Punctiform submucous hæmorrhages in stomach and intestines. Microscopic examination by Professor Bonome, of Padua : Left lung multiple foci of acute hæmorrhagic broncho-pneumonia, no Gram-staining micro-organisms or spirochætes. Liver, slight grade of acute atrophy, and slight small-celled infiltration of bile passages. Spleen congested, numerous small hæmorrhages in pulp.

2. Pte. N. D. Admitted August 28th, 1918, as a case of pneumonia. Jaundice developed on sixth day of illness, fæces clay-coloured, bile and albumin in urine. Temperature for first six days about 102°, fell to subnormal on appearance of jaundice, when pulse rose to 160, with delirium, epistaxis, and hæmatemesis, and purpuric eruption on the buttocks. Died on Sept. 1st. Guinea-pig inoculated with blood 12 hours before death with no result. Post mortem : lungs congested, many small hæmorrhages. Liver, no abnormality. Gall-bladder contained a small quantity of bile. Common duct patent. Spleen enlarged. Kidney, capsule strips with difficulty, multiple punctiform hæmorrhages. Stomach and jejunum, small submucous hæmorrhages. Microscopic examination by Professor Bonome : Liver, slight grade of acute atrophy of hepatic cells, dilatation of intralobular bile canaliculæ, with small-celled infiltration of the connective tissue; no Gram-staining micro-organisms, no spirochætes. Kidneys, acute nephritis, chiefly glomerular and interstitial. Spleen, small disseminated hæmorrhages.

3. Qm. S. C. Sudden onset Sept. 4th, 1918, with headache and general illness. Temperature 103·6°, and raised until ninth day of disease. Jaundice and herpes labialis on the fourth day. Slight purpuric rash on sixth day. Photophobia. Urine contained bile, albumin, and casts. Blood culture negative, "but inoculated guinea-pig died with a few spirochætes."

4. Driver F. Admitted Sept. 16th, 1918. Onset sudden three days before, with headache and general illness. Jaundice on the third day. Temperature 103°, falling to subnormal on the seventh day for a period of eight days, after which a daily variation from 97° to 101° or 102° for 14 days or more, when he was transferred to the base. Urine examined for spirochætes on the eleventh and thirteenth days with negative results. A guinea-pig inoculated with the blood of the sixth day died, and spirochætes were found in its liver.

The two cases of ascertained spirochætosis seem to weaken the suggestion, in the concluding remarks of the article, that another infective virus was possible, but the question whether two positives are to be accepted as invalidating so many negatives must be left to the judgment of the reader.

(Continued from preceding page.)

Medical Research, 1918, 548. 7. Archibald and Innes: Clinical and Pathological Notes of a Fatal Case of Bilharzia treated by Tartar Emetic, Jl. Trop. Med. and Hyg., 1919, 53. 8. Gregorson and Taylor: On Trinitrotoluol Poisoning, with Records of Five Cases, Glasgow Medical Journal, 1918, 65. 9. Kiyono and Murakami: Uber die Toxinproduction der Schistosomum-Kier und ihre Beziehung zur Entstehung der Leberzirrhose bei der Schistosomum-Krankheit, Verhandl der Japan. Path. Gesellsch. 10. Newham: Private communication, June, 1919. 11. Rogers: Colloid Antimony Sulphide in Kala-azar, THE LANCET, 1919, i., 505.

Medical Societies.

MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND:

THE ANNUAL MEETING.

THE seventy-eighth annual meeting was held at York on July 22nd and 23rd, under the presidency of Lieutenant-Colonel J. KEAY and, later, that of Dr. BEDFORD PIERCE.

Coördination in the Asylum Services.

Dr. J. G. SOUTAR moved the following resolution :—

"That a deputation be appointed to place before the Minister of Health the opinion of the Medico-Psychological Association that all matters concerning the care of the insane in England and Wales should as soon as possible be brought within the authority of the Ministry of Health; and that the Board of Control, whose sympathetic experience and encouragement in all matters concerning the welfare of the insane has been so valuable, be maintained for the department."

Dr. Soutar said they all recognised that coördination ought to exist in what they might call the asylum services generally. They felt it was preferable that the coördinating body should be within a Government department specially constituted to deal with the health of the whole community, rather than left to some self-appointed body which was inclined to consider asylum administration from a lay point of view and to eliminate the medical element. All who had had experience had seen for a long time that the Board of Control had maintained a most sympathetic attitude towards ideas of progress and advancement in matters of the insane. That was becoming more and more a medical, and less and less a legal, matter. The experience of the members of the Board of Control was vast; it would be a disaster if that sympathetic body should be scrapped and some new body established when the administration of lunacy passed into the hands of the Ministry of Health.

Dr. SHAW BOLTON said it was not fully realised how much it was desired by some members of asylum committees to eliminate the Board of Control. The object of the National Federation was to establish mental hospitals free from the Board of Control. He was strongly in favour of Dr. Soutar's resolution.

Dr. C. F. FOTHERGILL asked if it would include borderline conditions.

Dr. SOUTAR said they would rather not include them.

The resolution was carried unanimously, and it was agreed to send a copy of it to Dr. Addison, the Minister of Health, with a request that he would receive a deputation.

Training of Mental Nurses.

Dr. G. M. ROBERTSON said what was required in mental cases was two different qualifications. In the first place, the person must be a skilled nurse who knew how to care for sick people and look after the mentally deranged people. In the second place, it was important that he or she should be a person of good character upon whom they could rely. He ventured to say the character of a mental nurse was more important than the technical training. He moved :—

"That in future the three years' course of training for nurses applying for a certificate shall be taken in one mental hospital in place of not more than two hospitals."

Dr. W. F. MENZIES opposed the proposal. He thought that if the superintendent could not judge in six or nine months of the character of a nurse then he was not able to give any certificate of character at all.

Dr. SHAW BOLTON said that ever since he had been a superintendent he had systematically refused to take nurses from other institutions because they had so much to unlearn. He would like to see the question of training pressed to the fore.

The PRESIDENT put the motion, and Dr. Robertson's resolution was declared carried by a majority.

Hypnotic Suggestion.

Dr. G. R. JEFFREY read notes on a case treated by hypnotic suggestion. He referred to the great difficulty in the treatment of mental illnesses, and brought before the meeting notes

of a case which was treated by hypnosis and suggestion. He further suggested that even in advanced mental disease this method of treatment was, in suitable cases, always worthy of consideration. Dr. Jeffrey, in a few words, referred to the value of this method of treatment during the recent war in dealing with all sorts of so-called functional diseases of the nervous system. The case which formed the basis of this paper was that of a young woman who, after several months of very indifferent mental health, became distinctly worse after a dream, in which she dreamt that the sun and the moon had come into collision, with the result that the world was submerged in blood. She awoke from her dream in a state of terror, dazed and confused, and finally sought admission to Bootham Park Mental Hospital as a voluntary boarder. Under the influence of light hypnosis her illness was explained to her, and suggestion treatment generally was employed. She awoke next morning quite well, and left the hospital completely recovered after five days' residence.

Dr. ROBERTSON said he found in all cases in which he attempted hypnotism those suffering from melancholia were most difficult to deal with, whilst those with acute mania were extremely suggestible and easily hypnotised. Dr. Jeffrey had pointed out that the symptoms did not resemble those of ordinary melancholia; it was probably a case of what was known as anxiety neurosis. He (Dr. Robertson) thought that the dream which was related showed a decided sexual element.

Dr. R. M. LADELL agreed that melancholic patients were practically impossible to hypnotise. He wondered if it would be wise to drug patients sufficiently to get them quieter and then to superimpose hypnotism.

Dr. H. M. EUSTACE congratulated Dr. Jeffrey on being able to induce hypnosis. They realised personal magnetism was needed to induce it, and all had not the power.

Dr. JEFFREY agreed that it was a case of anxiety neurosis. He entirely disagreed with the sexual explanation. He gave particular care to try to find out if there was any sexual point, and there was none. He induced hypnosis in the usual way.

A Representative from Paris.

The PRESIDENT said that at this annual meeting they were honoured by the presence of a representative of the Medico-Psychological Society of Paris, Dr. Henri Colin, its honorary secretary. To our distinguished guest they extended a warm greeting and a hearty welcome, not only on account of his eminence as an alienist, and of the fact that he represents the sister society at our meeting, to which we are united by bonds of growing esteem and affection, but, if possible, even more so because he stands for closer union in all things with our brave and glorious ally, the heroic and immortal France.

Members Entertained.

Members were entertained to luncheon at the Retreat, Mr. YEOMANS, chairman of the Committee of Management, presiding.

The PRESIDENT, in thanking the committee for their hospitality, explained that the Association was practically an Irish association, and between Irishmen and Yorkshiremen were many points of similarity. They therefore expected to receive the kind of hospitality they had, and they showed it by coming to the Retreat for their new President. They had admired the committee's splendid hospital with its historic associations and its world-wide reputation for all that was good.

The CHAIRMAN said the committee appreciated the kind words which had been said. It was not the first time the Association had visited York. He remembered that his predecessor, the then chairman, took the opportunity of urging improvements in the education and status of nurses and encouraging a higher type of woman to engage in the nursing of the insane. He believed that idea had permeated the asylum world, and though they still had a nursing question it was of a very different character. They had endeavoured to preserve the homely character and domesticity of the institution, which had always been a feature of the Retreat. It was founded by William Tuke in 1796 and was the first asylum in England established on humane lines. Members subsequently inspected the buildings, and viewed with great interest the archives and other historic treasures of the committee.

The Afternoon Session.

At the afternoon session Dr. PERCY SMITH proposed a vote of thanks to the retiring President and officers of the Association. Colonel Keay had occupied the presidential chair for a year in addition to carrying on military duties, and they offered their hearty thanks to him. Dr. Smith added that it was a pleasure to him that Colonel Keay was to be succeeded by one of his (Dr. Smith's) old assistants at Bethlem Hospital in 1891, he meant Dr. Bedford Pierce. He went on to say that but for the work of the permanent officers the Association could not go on every year. He thought special thanks were due to Dr. R. H. Steen, the secretary (recently succeeded by Major R. Worth); to Dr. J. Chambers, the treasurer; the editors of the journal, who had had a very difficult and arduous task during the war; and the registrar. Also to the secretaries of the various divisions, who had accomplished most useful work.

Dr. C. C. EASTERBROOK seconded the motion, which was unanimously agreed to.

The PRESIDENT returned thanks on behalf of his colleagues and himself. He had great pleasure in handing over to Dr. Bedford Pierce the direction of affairs and ornamenting him with the badge of office.

Dr. PIERCE said he was very proud to wear the blue riband of the Association. He did not know that there was anything more pleasing in this world than to win the goodwill and appreciation of one's friends and colleagues. He had always been an ardent believer in the Association, and it would be a pleasure to him to do what he could to pilot it this next year.

The PRESIDENT announced that the Gaskell prize and gold medal had been awarded to Dr. James Walker and the bronze medal to Dr. R. Eager. There had been no divisional prizes. He believed the papers sent in had been of exceptional excellence.

Presidential Address.

The PRESIDENT then delivered his address on "Psychiatry—a Hundred Years Ago," an abstract of which appeared in THE LANCET of August 2nd. Before doing so he referred to the death of one of the late presidents, Dr. Joseph Wiglesworth, a distinguished and able man. In 1883, while superintendent at Rainhill, where he spent nearly all his professional life, Dr. Wiglesworth won the prize for an essay in which he dealt with certain states of melancholia attonita, or acute dementia, showing the inflammatory changes in motor cells.

Dr. D. G. THOMSON, in moving a vote of thanks, said he looked back historically to the problems of years ago. He brought out the fact that we were asked to-day much the same problems as those of 3000 years ago. He, with Dr. Pierce, was hopeful of the ultimate solution of many of them, and we should not sink into the feeling that the questions of insanity were unknown and unknowable.

Dr. SOUTAR, in seconding, said that the illnesses with which we had to deal were often due to social conditions over which we must exercise control if we were to stem the tide of mental disease. The next step was to deal with incipient cases.

In the afternoon, the committee of the Retreat gave a garden party to the members and their friends, a large number of guests attending.

Morning Session, July 23rd.

At this session, with Dr. BEDFORD PIERCE, the President, in the chair, Dr. G. L. BRUNTON read his

Notes on the Cytology of the Cerebro-spinal Fluid,

based on the examination of 100 cases of mental disease by Alzheimer's method. This method has the great advantage that cells in a fluid can be treated and stained similar to the methods employed in the histo-pathology of the tissues. He concluded that the cells of the greatest diagnostic importance are the plasma cell, the phagocytic endothelial cell, and the lymphocyte in excess; and that a high cell-count with an excess of lymphocytes, together with the plasma cells, is strong evidence of a parasyphilitic lesion. A number of excellent coloured diagrams were exhibited to illustrate the paper.

An interesting discussion followed, in which Dr. G. M. ROBERTSON, Captain OLIVER LATHAM (Australia), and Dr. F. H. EDWARDS took part.

Captain LATHAM said it was the custom in New South Wales to examine cases (of general paralysis) by Wassermann reaction; if no result, the cerebro-spinal fluid was examined by the method used for counting white blood corpuscles. They found this worked very well. Captain

Latham described at length cases of insanity frequent among children in Brisbane due to lead poisoning caused by scraping powder-paint from the verandahs.

The PRESIDENT contrasted the coördination in pathological work between asylums in N.S. Wales and those in this country, where every institution had to do what it could by itself.

Dr. J. E. MIDDLEMISS read a paper on

An Analysis of 200 Cases of Mental Defect.

The cases dealt with were analysed in tabular form from various aspects. The number of cases comprised under the four types recognised under the Mental Deficiency Act (1913) was given, as well as the number coming under the recognised clinical groups. The cases were further tabulated from the point of view of the different ætiological or associated factors. Reasons were adduced for regarding the customary division into primary and secondary groups as unsatisfactory. It was pointed out that on investigation cases of ementia presented every degree and variety of combination of the primary and secondary factors, so that it was frequently impossible to classify them on these lines. Instead, a broad division into two main types was advocated according to the presence or absence of a decided neuropathic strain as shown in the family history. Attention was drawn to two varieties of stigmata of degeneration not usually emphasised in the literature. 1. Variations in the actual as well as the relative lengths of the digits of both upper and lower extremities, but particularly the former. 2. Variations in the superficial reflexes. These were shown to be frequently modified in the direction of hyper- or hypoacuity, there being no constant relationship in the degree of response in the reflexes examined in each individual case.

Colonel W. R. DAWSON and Dr. EDWARDS contributed to the discussion on this paper.

Dr. HENRI COLIN (Paris) contributed a paper on

The Influence of War Fatigue on General Paralysis.

Dr. Colin said that the influence of the war was much greater than at first supposed. He drew attention to the fact that the emotions, the result of the war, were a very strong causative factor in general paralysis. He also drew attention to the very great acceleration of symptoms and the rapidity with which general paralysis developed following the shocks and general emotional state of those who had served in the trenches. In the case of many prisoners of war who had developed syphilis it was only a few months after the infection that symptoms of general paralysis supervened and death followed within a few months.

The PRESIDENT said the paper raised many questions of serious importance. Service members could speak to the acceleration of general paralysis due to war conditions. The whole question (of general paralysis) was in a very unsatisfactory position. He was much struck by the facts Dr. Colin brought out as to the effect of emotion, accident, &c., on the course of general paralysis.

Colonel DAWSON wished to know if alcoholism played a leading part in Dr. Colin's case.

Dr. ROBERTSON confirmed the rapid course of general paralysis during the war from observations at Morningside. He agreed with the statement, "No syphilis, no general paralysis," as true.

Dr. M. ROSS related his experiences in a military hospital during the latter part of the war. There were a large number of young men there, many with recent syphilis. Of these a large number died within a short time or became moribund. Dr. Ross said that a lot of the repatriated prisoners had turned out to have general paralysis. These men had been exposed to all sorts of privation, and most had a history of brutality as well.

Captain LATHAM described the treatment of general paralysis with salvarsanised serum in temporary hospitals in Australia. He said general paralysis was very serious in Sydney and one of the most important causes of death in New South Wales.

Dr. COLIN, replying, said they were agreed that alcohol, besides syphilis, must be a factor of general paralysis. He agreed with Dr. Robertson that syphilis was the primary factor, but, though the primary cause, there were many other contributory ones. There was a general lack of recognition of paralysis both here and in France, where many paralytics had been swept into the army. The knowledge of mental diseases was backward in every country.

Reviews and Notices of Books.

Geriatrics: the Diseases of Old Age and their Treatment, including Physiological Old Age, Home and Institutional Care, and Medico-Legal Relations. By I. L. NASCHER, M.D., Chief of Clinic Department of Internal Medicine, Mount Sinai Hospital Dispensary, New York, &c. With an Introduction by A. JACOBI, M.D. Second edition, revised. 50 plates, containing 81 illustrations. London: Kegan Paul, Trench, Trübner, and Co. 1919. Pp. xx. + 527. 21*s.*

THIS book is not a treatise on how to prolong life, but rather a text-book of diseases and morbid conditions—as they present themselves to medical practitioners in their treatment of aged patients—giving rise to what the author terms *pathological* old age. Old age in itself is not pathological, and normal old age, to which the author devotes a first portion of the book, cannot be remedied. He discusses the anatomical and functional changes connected with the physiological state of senility, and shortly reviews the theories of the causation of ageing. But the bulk of the book is given up to a methodical account of the diseases and morbid conditions of old age, in which senile diseases are considered as (1) primary, (2) secondary, (3) preferential, and (4) modified, the latter dealing with such diseases as asthma and pneumonia when complicated by senility.

Following all this a considerable portion of the book is given up to the long series of diseases which are relatively uninfluenced by old age, such as many acute infectious diseases, leukæmia, muscular rheumatism, &c. The 11 pages on Surgical Procedure in Senile Cases—a fresh chapter introduced into the second edition—are based "upon the views and experiences of surgeons who have had an extensive practice in senile cases." The author says that, in spite of a few optimistic sentiments that have been expressed on the subject, surgeons generally never operate upon a senile case if operation is avoidable. He holds that the saying, "Age is no bar to surgical operations," should be accepted "only if the infirmities and debilities, the degenerations and pathological conditions to which the aged are particularly liable, are kept in mind at every stage through the preoperative period to complete convalescence."

Very important is the final section of the book on the Hygiene of the Aged (Home Care and Institutional Care) and the Medico-Legal Relations of Old Age, including such subjects as Sir George H. Savage recently and ably dealt with in his post-graduate lecture on "Mental Disorders Associated with Old Age."[1] We do not believe that it is human nature in most parts of the world to give less attention to the wants of the aged members than of the infantile members of the family (and in this respect the *dutiful* sons and daughters of Hebrew families in the East End of London may specially be referred to). The reverse seems rather to be the case, and the fact that the present large work has already reached the stage of a second edition seems to support our view. We feel tempted to prophecy that there will be a growing demand for this kind of book.

In regard to treatment, as already stated, the author does not seek to remove the normal infirmities of old age—what he wishes to help in is to convert a *pathological old age* into a *physiological* one. The subject is a very complicated one on which much remains to be studied and discussed. On p. 17 the author writes: "The popular conception of old age is based upon the appearance of the individual. It is not unusual, however, to find apparently decrepit individuals regain strength, mental activity, cheerfulness and a more buoyant spirit, as well as a more youthful appearance when freed from care and the necessity to work. This is a common observation in inmates of homes for the aged shortly after their admission." But is not this partly due to a kind of reawakening of the mind by the altered, and doubtless improved, social surroundings? Freedom from care and from work may have a quite different effect, according to what is observed in the upper and middle classes, when a man retires from his profession or business, and is without sufficient interests, including "hobbies," to keep his *mind*

[1] THE LANCET, June 14th, 1919.

exercised *as well as his body*. Exercise for the body and occupation of some kind for the mind are as necessary in old age as at any other period of life—if not more so! Without them the body soon loses in vigour and in resistance towards disease, whilst the mind more rapidly degenerates and more readily falls a victim to morbid "growths," which arise like tares in neglected soil—"mental growths," which not only prey upon the mental faculties, but indirectly involve and play havoc with the functions of other organs besides the brain.

On Longevity and Means for the Prolongation of Life. By Sir HERMANN WEBER, M.D., F.R.C.P. London: Macmillan and Co., Ltd. Fifth edition. 1919. Pp. 292. 12*s*.

NOT many authors have so soundly justified the principles which they laid down for the pursuit of a certain course as did Sir Hermann Weber in this treatise on the prolongation of life, for he died in his ninety-fifth year. The edition now before us, the fifth, was in type at the time of his death, and is issued under the editorship of his son, Dr. F. Parkes Weber. The book is an expansion of a lecture delivered before the Royal College of Physicians of London in 1903, when the author had already attained the respectable age of 80 years. The book is full of sound sense, and is founded upon a belief in exercise, fresh air, moderation, cleanliness, and cheerfulness. This is a following of the old Salernitan dictum:—

> Si tibi deficiant medici, medici tibi fiant,
> Haec tria, mens hilaris, requies moderata, diaeta.

We are glad to see that Sir Hermann Weber speaks in praise of gardening, for it is an admirable and useful occupation for those getting on in years, though we rather demur to his description of weeding as a "light" occupation. Gardening certainly conduces to sound wholesome sleep at night and is a means for keeping a man out in the air, especially those—and they are many—to whom walking is anathema. Sir Hermann Weber's remarks upon diet are in general thoroughly commendable, but we think that he is a little too sweeping in his condemnation of wine. Many elderly persons find that, say, a pint of really sound light claret in the 24 hours has no harmful effect, but rather the contrary, in that it aids digestion. At the time of the death of Sir Moses Montefiore, who died in his hundredth year, it was currently reported that he had drunk a bottle of port every day of his life since he grew up. His is not an example to be followed, for the ordinary man is better without alcohol except in a really moderate amount and in the shape of a wine of good quality.

The Diagnosis and Treatment of Heart Disease. By E. M. BROCKBANK, M.D. Vict., F.R.C.P. Fourth edition. With illustrations. London: H. K. Lewis and Co., Ltd. 1919. Pp. 158. 5*s*.

IN its rapid passage through three editions this little collection of practical points for students and practitioners has not had an opportunity to get out of date. Several alterations and some additions have, however, been made to the third edition, and the text is practical and reliable as ever. Students who think that they know all about the auscultation of the heart will do well to read it through before their final examination.

Instrumental Orthopædics (De l'Orthopédie Instrumentale). By Dr. GABRIEL BIDOU. May, 1919. Twenty plates. Imprimerie des Orphelins-Apprentis d'Auteuil, 40, rue La Fontaine, Paris. Pp. 132.

THIS little book, which deals chiefly with the instrumental treatment of paraplegia, discusses at some length the principles on which apparatus should be constructed. The author advocates celluloid in place of leather, and has adopted the principle of active control which is so well known in the American type of artificial leg. He also employs indiarubber springs, and in certain cases multiplies the range of movement by the use of pulleys and levers.

The Great War Brings it Home. By JOHN HARGRAVE. London: Constable and Co. 1919. Pp. 367. 10*s*. 6*d*.

THE argument of this book is an essay in sociology. The present state of civilisation is considered to result from an unhealthy, because restricted, development of the individual. We are living by purpose instead of by impulse, and so are losing in vitality and suffering from the effects of repressed instinct. The Great War has awakened us to the fact that we are moving along a false trail. The right way is the natural way: the normal instincts if allowed freedom to develop from an early age will produce, according to the author's view, a higher type of creature. The argument is profusely illustrated from a wide knowledge of primitive life and customs. The careful reader will find many criticisms to make, and though he may not be convinced by the argument he cannot fail to be interested by the illustrative detail.

Induction Coils in Theory and Practice. By Professor F. E. AUSTEN, E.E., U.S.A. London: Messrs. E. and F. N. Spon, Ltd. 1919. Pp. 64. 5*s*. net.

IT is difficult to conceive of any class of student to whom this book could be recommended. It is of the "potted" order, being divided into 245 numbered paragraphs, ranging from a definition of the term "equation" to an explanation of the exponential function. There are occasional excursions into the Calculus, and the amount of logic in the arrangement may be estimated from the fact that para. 110 contains a differential equation, and para. 235 deals with the theorem of Pythagoras. The subject-matter is the result, so we are told in the preface, of the author's experience in directing courses in the American Army. We must suppose that the luckless students had to face these 245 paragraphs much as they might have to face the Chinese characters. No explanation is given of the almost uni-directional character of the secondary discharge or of the effect of the condenser. There are two graphs in the book, on one of which the coördinate units are not even indicated.

Some of the diagrammatic representations of apparatus are good, and the specifications of different types of coil are of value to those who wish to build up coils of their own, though the same information could probably be obtained from a shilling manual.

JOURNALS.

Mental Hygiene. Vol. III. No. 1. January, 1919.—This number contains several articles by some of the leading psychiatrists of America, who have succeeded in writing in an entirely popular style in order that the journal may appeal to the lay mind. While this is a feat of no small merit in itself it does inevitably result in certain limitations. There is, for instance, a tendency to multiply words and examples as well as a striking absence of references. The organisation of the neurological department of the American medical service in the late war is the subject of an editorial article. Profiting by the experience gained during the earlier part of the war in the French and British Armies, the Americans attached to each division a neuropsychiatrist, who was stationed in the most advanced field hospital. This arrangement proved the value of early treatment in war neuroses. Only 1 per cent. of the cases presenting themselves at the advanced hospital were ultimately invalided to America.—Dr. Mactie Campbell has contributed an interesting paper on Nervous Children and their Training. He attributes to errors in home education at an early age many of those untoward and "irregular" symptoms which cause so much trouble in later life. A number of cases are quoted to illustrate the harmful results of indulging the caprices of sensitive children instead of helping them to adapt themselves to their environment. The physician in these cases has to treat the nervous child by educating the parents. He has, in short, to treat not a symptom but a situation.—Dr. Adolph Meyer discusses the Right to Marry. Excluding "imbeciles and many psychopaths," and granting the possibility of a healthy environment for the future children, he believes that an individual of "tainted stock" should be allowed to marry another whose ancestry shows only normal individuals. Marriages cannot be controlled by law, nor are intentionally childless marriages to be encouraged. A propaganda of the laws of heredity, so that marriage shall not be undertaken without a clear understanding on the part of both contracting parties, is advocated as the better way. Runaway marriages should be made a legal impossibility, as they are in Switzerland.—The annual census of the insane is considered statistically by H. M. Pollock, Ph.D., and E. M. Furbush, A.B., B.S.—There are articles also of interest to the sociologist and educationalist, as well as abstracts of reviews of English and American literature.

In the *Military Surgeon* (Washington, D.C., U.S.A.) for May Professor Theodore Tuffier, consulting surgeon to the French Army, gives an account of the transport service for

wounded by aeroplane as it was extemporised in the Sahara with its wide spaces, turbulent tribes, and military posts, hardly accessible except by air. A general officer, wounded in the chest at Tafilalet in South Morocco, had to be carried 26 miles by bearers to Ksar-es-Souk. A major of the French Medical Service was sent to him by aeroplane, 200 miles over the mountains and into the desert. The patient was found to require an X ray examination, which would only be given at Bou-Denib, 60 miles away and isolated by enemy forces. There was nothing for it but to transport the patient thither by aeroplane, which was done in an hour by a Farman aeroplane, and the subsequent operation was now carried out with knowledge, and, happily, with success. Professor Tuffier goes on to say that an aero-ambulance service is in organised existence in the South of Algeria (Sahara) and in Tunis. Patients are carried about 100 miles a day, generally in Farman aeroplanes, and they should be sent in the early morning. It is, however, impossible to send them during a Scirocco wind, which shrouds the desert in a high, dense dust-cloud and prevents the pilot from finding his way and makes landing impossible.—Major M. C. Winternitz, U.S.M.C., details the damage done to the lungs of dogs by irritating poison shell gases, and shows that the ultimate effects closely resemble those of influenzal-pneumonia, the pathology being similar. In each the epithelium of the air-passages is destroyed, the lung thus loses its protection and is exposed to infection from the bacilli of the mouth, which rapidly spread through the extensively œdematous pulmonary tissue. It will be recalled that in the April number of this magazine Major Dodge mentioned that a 1 in 10,000 quinine sulphate gargle seemed to protect influenza cases from pneumonia.[1] Mustard gas sets up a spasm of the bronchioles which keeps it out of the air vesicles, but where it does reach the lung it causes necrosis. (The worst examples of necrosis of epithelium in larynx and bronchi in the College of Surgeons War Museum are ascribed to mustard gas.) Chlorine and phosgene have similar actions, but chlorine acts more on the upper air passages, phosgene on the vesicles, in which it breaks up, forming nascent chlorine. The paper, which is the outcome of experiments on some 1500 subjects, should be read.—Lieutenant-Colonel W. B. Cannon tells of his researches on wound shock, which is, he urges, a toxæmia due to absorption of poisons from dead or dying cells. These poisons cause great outflow from the blood-vessels into lymph spaces with resultant halving of the blood pressure. Thus he accounts for the sweating and chilliness of the patient and the poor circulation with accumulation of red blood cells in the peripheral vessels, consequently poor aeration of the tissues, and in the advanced stages air hunger. He recommends, as the first treatment, warmth. If the patient is on a stretcher he should have blankets below him as well as above; rectal or intravenous saline injections or gum-salt solution injections should ring the changes with transfusion. Tourniquets are not to be lightly removed from shattered limbs; they prevent the shock-toxins becoming diffused through the body, and shock has often appeared for the first time just after a tourniquet has been removed. The only anæsthetic to be used in shock is nitrous oxide and oxygen. Thus he upholds the conclusion of Mr. Cowell in his Arris and Gale lecture.[1]—Major J. Bayard Clark reports on what he saw of the treatment of venereal disease in England in 1918. He paid many surprise visits to military hospitals, which he always found clean and well managed, well equipped, and with a sufficient staff. He professes himself satisfied with us and notes that "the percentage of complications in all hospitals was very small."

THE ENHAM VILLAGE CENTRE FOR THE RE-EDUCATION OF MEN DISABLED IN THE WAR.

THE first annual meeting of the Village Centres Council was held recently at the house of the chairman, Lord Henry Cavendish Bentinck, M.P., Sir George Makins, Vice-President, in the chair, when the administrator, Major Garthwaite, reported that the Enham Village Centre, opened for ex-Service men on May 31st, had 30 men in residence receiving medical treatment and undergoing training, mainly in horticulture, agriculture, and forestry. Workshops for basket-making, electrical fitting, and carpentry had also been opened, and in other directions the re-education of men disabled in the war was being undertaken.

Dr. Fortescue Fox, the medical director, said that the interval between a man's discharge from the army and his reception at Enham varied from 1 to 43 months, with an average period of 12 months in their own homes. Nineteen out of the total of 30 had not done any work during this time, and ten had attempted to return to work and had broken down. All of them were now doing some work at Enham, under medical supervision, from two to six hours daily. Many kinds of physical and mental disability were represented. Nearly half the cases were definitely neurological, and under the care of Captain Douglas-Morris, R.A.M.C., the neurologist, who often made use of mental treatment with advantage. Several men had come with paresis, after fracture of the skull, and all of these were quite unfitted for the nervous strain and noise of town life, and had improved in the country. Cases of old wounds of the arm, with stiffness and wasting, were put to light curative work, such as thinning grapes, clipping hedges, sawing, or wood-cutting. Sensation as well as movement could be re-educated by appropriate work, such as planting seedlings or picking fruit. Games like bowls were very helpful. Whatever label was attached to the disability all the men should be regarded as neurasthenic. A large proportion—perhaps the greater number—would never be able to compete with able-bodied men in industry; therefore, looking ahead, it seemed likely that the Village Centre would become not only a centre for treatment and training, but a centre for providing special industries for permanently subnormal men, for whom there would always be needed a measure of protection. The process of re-education and the choice of their occupations required far more care than had hitherto been bestowed upon them, and should be based upon exact measurement of each man's physical and mental capabilities, with special regard to individual tastes as well as pre-war occupation, family circumstances, and the condition of the labour market. It was not sufficiently realised that the industry of the disabled, if properly guided, was capable of making a very large addition to the production of the country.

Mr. Rowntree, architect to the council, gave particulars of the housing scheme of the council. The Chairman and Sir R. Godlee expressed the hope that types of disablement would be selected for Enham which were capable of being effectually treated, so that a considerable number of cases could be passed rapidly through the centre.

[1] THE LANCET, July 26th, 1919.

New Inventions.

IMPROVED FORCEPS.

FOR the last four years all my artery and tissue forceps have been made with a bowed lock at the end as part of the circular finger ring. The illustration shows this lock applied to towel clips, to the Mayo-Ochsner angular forceps (open), and to mosquito forceps (closed). The advantages

of the attachment are greater resiliency and increased leverage in locking, more facile opening and closing, and—one great convenience—sutures are no longer liable to become caught up between the finger rings as with the ordinary forcep lock.

Messrs. Charles F. Thackray, Great George-street, Leeds, are the manufacturers.

Aspley Guise, Beds. BRYDEN GLENDINING, M.S., F.R.C.S.

THE LANCET.

LONDON: SATURDAY, AUGUST 9, 1919.

An Anthropometric Index of Physical Fitness.

THAT little children are more apt than adults to suffer ill-effects from remaining uncovered in a cool atmosphere is a fact that is known to every mother, and all surgeons recognise the importance of keeping children warm when prolonged exposure on the operating table is necessary. The reason for this is that the surface area of the child's body bears a higher proportion to the body volume than is present in the larger body of the adult, since increase of volume outruns increase of surface with general growth of the body. We may say that body surface represents the area of heat loss, while, in great part, body volume represents the area of heat production. Considered in this simple way we would naturally be prepared to find that the expression of internal heat production should be "a simple function of the body surface," as in another column of THE LANCET Professor GEORGES DREYER has shown it to be, rather than "a simple function of height, as HUTCHINSON claimed." But Professor DREYER'S important researches have proved much more than this. They not only show that the smaller and lighter individual, with his relatively larger surface, has a greater vital capacity per unit of body weight than the larger individual, but they also seem to prove quite definitely that no anthropometrical standard of health that has so far been suggested is so true an index of fitness as is the vital capacity when this factor is considered in its proper relations. Mere measurements of height, weight, girth, or proportions become insignificant as clues to physical fitness when they are compared with the vital capacity constant of Professor DREYER.

Professor DREYER'S reference to HUTCHINSON recalls, and rightly, to the memory of medical men one whose painstaking and somewhat neglected work, given to the world over 70 years ago, seems now to be coming to its full appreciation. If the most recent research has shown that he was but a poor mathematician it has increased our admiration of him as a true pioneer possessed of accurate scientific insight. On April 28th, 1846, before the Royal Medical and Chirurgical Society, JOHN HUTCHINSON read a paper with the following title, "On the Capacity of the Lungs and on the Respiratory Movements, with the view of establishing a precise and easy method of detecting the disease by the spirometer."[1] In this paper, after describing the movements of respiration, he divided air into (1) residual air; (2) reserve air; (3) breathing air; (4) complemental air; and (5) vital capacity. His definitions seem to have been original in many ways, but were at once accepted, and for that matter most of his communication was perfectly sound. He narrated results which he had found in 2000 cases and showed the effects upon what he termed "vital capacity"—namely, "the greatest voluntary expiration following the deepest inspiration," which were produced by height, weight, age, and sickness. At the same time he exhibited an instrument which he called a spirometer, and which was devised to record the respiratory movements in health and disease. Mr. HUTCHINSON'S audience were obviously impressed by the industry and ingenuity which he had displayed throughout laborious investigations, and they appear to have accepted as a reasonable discovery his dictum that if the height of the individual be known, the number of cubic inches of air which he is able to expire in the healthy state can be calculated with tolerable accuracy. As Professor DREYER shows, this was an unwarranted deduction, but the value of the early researches remains.

The fixing of standards of vital capacity for the different elements of the population is a work of national importance, for by this means better than by any other shall we arrive at a true index of fitness from which the individual may be judged. Those upon whom the responsibility for the national health and national welfare will devolve should note the interesting fact that the Boy Scout possesses a vital capacity about 15 per cent. greater than the boy who is not a scout. Croakers about racial degeneration would do well to compare the vital capacities of the gentleman of to-day and of JOHN HUTCHINSON'S gentleman of the "forties." But the most important result which we expect from Professor DREYER'S work is a definite understanding, first among medical men, and secondly among the public, as to what significance is to be attached to the phrase "good physique." What does "good physique" mean? Vaguely we all know the kind of well-set-up individual implied, but when we go to see Mr. JAMES WILDE fight do we use this phrase about him? We do not, but clearly his physical fitness is colossal, though his frame is small. It is absolutely necessary that we should not be misled in the future by vague terminology, but should arrive at standards whereby physical fitness can be determined. The Medical Research Committee, whose assistance to Professor DREYER in his researches has been openhanded, is engaged at the moment in obtaining facts along similar lines, with the assistance of the heads of certain Government Departments. The results of these researches, when added to Professor DREYER'S results, will supply a really important body of evidence upon which it should become easier to evaluate the normal criterions of health; we trust therefore that there may be no long tarrying.

[1] THE LANCET, vol i., 1846. p. 630.

The Tuberculosis Curve.

THE ominous reports on the increasing prevalence of tuberculosis in many European countries have inevitably provoked criticism of anti-tuberculosis measures which a few years ago were almost tacitly accepted as sound and satisfactory. It was hoped of the Insurance Act, for example, that, framed as it was in many respects with special reference to tuberculosis, it would soon justify its existence by an appreciable fall in the death-rate from this disease. This hope has not been realised. But is this failure traceable to factors which the Insurance Act cannot, in common fairness, be expected to control, or is the Act directly to blame for the present state of affairs? Dr. B. G. M. BASKETT, of Rayleigh, appears, in an interesting communication he has addressed to us, to take the latter view. The economic factor is, in his opinion, the only one which explains all the phenomena of the

tuberculosis death-rate in this country; and he sees in the Insurance Act, or rather in the policy of which the Act is the supreme expression, the cause of the conversion of a falling to a rising tuberculosis curve. His words are so much to the point that we reproduce them exactly:—

"Briefly, from 1840–1915 we have (1) a period of laissez-faire, with no public arrangements for treatment of disease and medical skill at its lowest—sequel, a huge drop; (2) a period of tempered laissez-faire—sequel, a slightly lower but very satisfactory continuation of the fall; (3) a period of municipal and State benevolence ever growing more intense—sequel (*a*) a slackened drop, and (*b*) an actual rise, after the largest measure of paternalism in English history. How are we to explain the brilliant success of laissez-faire, with medical knowledge at its lowest and no public means of treatment, and the dismal failure of State collectivism with indefinitely increased medical knowledge, and 'all the means and appliances to boot'? Why should we have maintained almost constantly for 56 years a decrease of about 200 per million in the mortality in each five years, and have made less progress in the last 20 years than in any previous five, except two very early in the period? Why should we have been able justifiably to talk in the nineties of the approaching extinction of tuberculosis, when in 1918 the Registrar's officer of statistics gravely suggests that it may be possible to revert to old conditions? I submit that there is only one facter which explains all the phenomena, the economic."

No doubt the economic factor plays a very important part in tuberculosis. It is, in innumerable cases, the disease to which the poor man succumbs, and from which the rich man recovers. A balance at the bank, with balance of mind, is the best preventive of tuberculosis yet discovered. And the economic policy which secures the greatest prosperity for the working classes must, other things being equal, be the policy calculated to lower the tuberculosis rate most effectively. So far we agree with Dr. BASKETT, though we are not prepared at this juncture to discuss the respective merits of a laissez-faire or a paternal policy. Nor do we believe that sufficient data are yet available for forming a correct estimate of the effect, good or bad, of the Insurance Acts on the incidence of tuberculosis. The war alone has obscured the issues far too effectively for such a balance of accounts to be attempted at present. In regard to the influence of the war itself on the development of tuberculosis we think that some confusion has arisen from a failure to analyse carefully the factors concerned. It is evident that the fighting man in general, while exposed to horror and hardship, was obliged to live an active out-of-door existence, with the opportunity of an abundant diet and under the close supervision of a trained sanitary personnel. Even in countries where famine threatened every nerve was strained to keep up the physique of the men at the front. Undoubtedly these men have broken down with active tuberculosis in considerable numbers, but military service has not necessarily been attended with catastrophe in ex-sanatorium patients. How many compositors, shop-assistants, and brewers' draymen, on the other hand, were prevented from becoming frankly tuberculous by their change of environment cannot, of course, be stated. But the number is large, even as numbers go in war-time.

A group of totally different factors was concerned in bringing about increased tuberculosis in civilian circles during the war. Here all the normal predisposing factors were present and accentuated, and on them were superimposed the limitation in diet—to put it mildly—and the hindrance to free ventilation entailed by the light-screening regulations. It is therefore demonstrably absurd to suggest that the economic factor explains all the phenomena of the tuberculosis curve in this country. This curve is criticised because its steep decline is not maintained; it flattens out and then begins to rise. Setting aside this rise, which is largely, if not wholly, due to the war, even if influenced, as Dr. F. A. ELKINS and Dr. H. H. THOMSON show in an article appearing in our columns, by such a factor as overcrowding in asylums, we get a curve such as is obtained by emptying a viscid fluid out of a vessel where the emptying becomes progressively slower. Can the stamping out of a disease, the germs of which exist in over 90 per cent. of the adult inhabitants of civilised communities, follow any but a "viscid" curve? Leprosy was, no doubt, quickly stamped out in Norway by effective isolation measures, but, in spite of the close morphological relations of the two bacilli, leprosy and tuberculosis differ so fundamentally that this comparison is apt to be misleading. Isolation of the advanced consumptive—the prevention of massive infection—may be beneficial to the rest of the community, and it was suggested by KOCH that the abrupt fall in the tuberculosis death-rate in England in the middle of last century was to be traced to the segregation of dying consumptives under the Poor-law. But this same abrupt fall has also been correlated with the conversion of this country to an industrial life, which, it is argued, affords many opportunities for frequent accidental inoculation of small quantities of the tubercle bacillus—a beneficial process. Again, in the "sixties," far-reaching sanitary reforms in certain English towns coincided with a remarkable drop in the tuberculosis death-rate; in Newport and Leicester it fell 32 per cent., in Salisbury 49 per cent. If we are to be perfectly candid, we must confess to considerable ignorance of the factors influencing the form of the tuberculosis curve during recent years. Dr. BASKETT'S questions, which pursue a frequent line of criticism, will be valuable if they stimulate research into the general conditions.

The Holding of Inquests in Camera.

AT two recent inquests held by Dr. F. J. WALDO the cases have been of alleged suicide by the deceased throwing themselves in front of trains, and the coincidence led the coroner to offer suggestions as to the publicity now given to the proceedings at inquests. The juries endorsed his words, disclosing thereby what appears to be public opinion. Dr. WALDO'S view, which was to some extent supported by witnesses whom he questioned during the two sets of proceedings, is that the publication of the details of an inquest upon an apparent suicide has not infrequently put the idea of self-destruction into the minds of others. These persons may possibly be weak of intellect, or broken down by distress, or racked with apprehension; but though, for this reason or that, inclined to take their lives, the fatal determination dates from the moment when they read that fellow creatures have succumbed to the impulse. Having got thus far down the path to death, it may be that the details of suicides, as reported in the papers, will advise them of simple means for ending their lives. It may be said that the opportunities for

suicide offered by a passing train, an open gas-tube, or a silent pool need no writing up to bring them to notice, but none the less the printed accounts of such cases do serve as an actual stimulus. It is impossible not to ascribe to some extent the frequent recurrence of certain methods of suicide to the suggestion afforded by example and by printed record. The fact that a man or a woman has committed suicide in a certain way is likely to be known without newspaper reports in the immediate circle of the event, but it is not here that the sinister influence of example is felt. The evil grows as the influence spreads to a wider population which includes among it a large number of susceptible subjects.

As far as neighbours are concerned nothing would be gained by suppressing the evidence at the inquest. On the other hand, rumour often makes a suicide out of an occurrence which really was an accident, and in this event it may be very desirable that not only the verdict but the evidence leading up to it should be known. The possibility that the public trial of shop-lifters and burglars, to say nothing of other criminals, may suggest a life of profitable adventure to unscrupulous persons has never caused anyone to suggest trying such rogues in camera, or dispensing with the deterrent advantages attached to punishment publicly imposed. We pride ourselves, on the contrary, upon the publicity given, whether to their conviction or their acquittal, as maintaining the national confidence in our courts of criminal justice. The medical profession is interested in the question of wide publicity, chiefly because its members appear as witnesses at practically every inquest that is held, as well as in very many trials arising out of criminal offences. Publicity tends in their case to secure the giving of full weight to their evidence by those before whom it is laid, for a vital witness can much more easily be ignored if no public opinion is there to criticise the proceedings. Publicity also means for medical men the appreciation of their testimony by all members of their profession who may chance to read it. It helps moreover to exclude from the witness-box persons who might otherwise endeavour to pass themselves off as medical witnesses. An unqualified quack would have a much better chance of escaping undetected in camera than he has in a public trial, followed by the publication of his evidence and of the name and address under which he tendered it.

We do not suggest that the publication of columns of scandalous detail not directly bearing upon the cause of death, such as has recently taken place in the case of two women, is of any value to the community. But while we admit the force of the contention that the inquest held in camera could never become an inducement to suicide, we still think that society at large is better served by the existing publicity.

WITH reference to the increased subscription to Fellows of the Royal Society of Medicine living within a mile of the Society's House, the Treasurers of the Society make the following announcement:—

By resolution of a special general meeting of the Fellows, this increase is n t to apply to Fellows who have served abroad for 24 months or more, or have been unable to practise on account of war service, until Oct. 1st, 1920.

Fellows who desire to take advantage of this privilege should send necessary particulars to the secretary as soon as possible.

Annotations.

"Ne quid nimis."

THE ÆTIOLOGY OF INFLUENZA.

THE recent pandemic of influenza has afforded an opportunity to bacteriologists to review the ætiology of this disease and to investigate it further, an opportunity of which advantage has been largely taken, as a review of our columns in recent months will show. The result is somewhat surprising, since the outcome has been seriously to assail the position previously accorded to the Pfeiffer bacillus, isolated in 1892, as the cause of the disease, and to bring the whole question into the arena of controversy. The Pfeiffer bacillus is still regarded by some authorities as the infective agent, and it is claimed by them that with improved methods it can be found in a very large percentage of cases of the disease. Others again, while accepting its presence in many cases of influenza, assign to it a secondary rôle as contributing to the clinical manifestations or complications of the disease, much in the same way as the pneumococcus and streptococcus are believed to do; and on this view its inclusion in the triple vaccine employed as a prophylactic is justified, even though it is not regarded as the actual exciting cause. One fact seemed early to emerge from the controversy—namely, that in the minds of highly competent bacteriologists there was room for scepticism in regard to the ætiological rôle of the Pfeiffer bacillus, and that at best the critical verdict regarding it must be one of not proven. It was natural, therefore, that research should be more especially directed to two points—one the further investigation of the Pfeiffer bacillus, the other a search for other organisms. A plentiful crop of possible causative agents has resulted, varying from ultra-microscopic filter passers to pleiomorphic cocci. The result at present can be nearly described as confusion, from which, however, we may hope to see some definite results.

An interesting and suggestive contribution to the subject is afforded by a paper which we publish in another part of our present issue by Dr. G. E. Beaumont. He states that he was impressed by the comparative infrequency of the Pfeiffer bacillus and by the pleiomorphism of the organism separated by Donaldson with its possible relation to one of the filter-passing organisms described by other observers. He now records some observations suggesting that influenza is in reality a mycosis, sometimes bronchial, sometimes intestinal, due to a mycotic parasite with several stages in its life-history; and he offers the suggestion that the discordant results of other observers may find their eventual explanation in the pleiomorphic character of the parasite he describes. He is careful to disclaim priority or originality for his observations, pointing out that they are an extension of those of Captain H. J. B. Fry, who described a large spore stage and a hyphal stage in the parasite he isolated from cases of influenza. Dr. Beaumont describes eight forms in the life-history of this parasite—namely, hyphæ, large spores, coccal clusters, small spores, tetrads, mulberry masses, chains of cocci, and bacilli. These forms he has found in varying combinations in films made from the sputum in cases of influenzal bronchitis and broncho-pneumonia, and in the fæces of cases of influenzal

enteritis. The reactions to the Gram-staining method of these various forms appear to be very variable, and this peculiarity was also to be observed in the cultures made on various media from the sputum. These cultures also gave interesting and suggestive results when examined under the microscope, as they, too, showed pleiomorphic characters. Although Dr. Beaumont used the various media suggested as specially adapted to the growth of the Pfeiffer bacillus, he was not able to isolate it. He sometimes obtained single colonies which showed characters resembling the Pfeiffer organism, but they were never pure and often contained Gram-positive coccal elements; moreover the Pfeiffer-like organisms would often disappear in subculture. Dr. Beaumont has in addition made a few observations on the urine and blood in cases of influenza, and in the former he has obtained all the stages of the parasite he describes. In the blood in primary cultures he has recovered several of the stages or forms, but only in one case was he able to obtain growths in subculture.

Dr. Beaumont's observations are admittedly incomplete, but they are sufficiently striking and suggestive to require further examination at the hands of other workers. If his results are confirmed and the organism is submitted to and fulfils the full tests of the Koch postulates, then the relation of the various forms of the parasite to one another and to the different organisms found in this disease by other observers will afford interesting matters for investigation and possibly serve, as Dr. Beaumont suggests, to clear up the confusion at present existing by explaining the discrepancies and coördinating the divergent views.

PRACTICAL ISSUES OF THE ALCOHOL QUESTION.

THE Medical Research Committee have issued a further report[1] on the alcohol question, in which the main results on manual work and on the coördination of fine muscular movements agree well with those reported previously by Dr. Mellanby. Dr. Mellanby's report (No. 31 of the series) was dealt with in our issue of July 19th in an annotation under the above title. The present investigation was undertaken by Dr. M. H. Vernon, who was assisted by Dr. W. C. Sullivan, Captain M. Greenwood, R.A.M.C., and N. B. Dreyer. Both reports show the important differences between the effects produced by alcohol when taken with or without food, a question which we have pointed out again and again has a practical bearing, and which, Dr. Vernon now remarks, has been curiously ignored by most previous investigators. The Medical Research Committee agrees that the relations between the consumption of food and the physiological effects of absorbed alcohol are so important (as these recent studies show) that much previous work upon the effects of alcohol is now seen to have been impaired in value by disregard of the presence or absence of food in the stomach during the experiments. The influence of alcohol on manual work and on neuro-muscular coördination was investigated in eight men and five women. In seven of the subjects observations were made on the accuracy and speed of typewriting, in three on the accuracy and speed of working an adding machine, and in six on the accuracy with which a target could be pricked. The administration of alcohol produced some effect in all of the individuals tested by the typing and adding-machine methods, the degree of effect depending largely on whether the alcohol was taken on an empty stomach or with food. On an average it was about twice as toxic under the former conditions as under the latter. In the foodless experiments one subject made 88 per cent. more typing mistakes after she drank 11·2 c.cm. of alcohol. Another subject increased his adding machine mistakes 74 per cent. after taking claret containing 19·4 c.cm. of alcohol; another increased her typing mistakes 156 per cent. after drinking sherry containing 22 c.cm. of alcohol. In some subjects, however, a moderate dose of alcoholic liquid taken with food produced no measureable reaction. Such a non-reactive dose amounted to one glass of port in a male subject and to 4 oz. of port in a female subject. One subject who a year before had been rather a heavy drinker showed little, if any, reaction, even after drinking whisky containing 45 or 60 c.cm. of alcohol. He was tested by the target method and took the whisky three hours after food. In the target method, rows of dots, made on squared paper fixed vertically at arm's length, were pricked at three-minute intervals before and after the alcohol. The average distance of a puncture made from the centre was about 1·8 mm., but after taking 30 c.cm. of alcohol the target-pricking error increased 12 per cent.; after taking 37·5 c.cm. it increased 43 per cent., and it continued to increase in arithmetical progression with the dose of alcohol till it was 132 per cent. above the normal when 60 c.cm. were taken. To sum up, this inquiry would seem to endorse by scientific measurement what has been recognised for a long time in practice. The creature of addiction, or one who has acquired the habit of moderate alcohol consumption, shows a negligible result to moderate doses of alcohol according to the tests here applied. In other words, the body has a remarkable power of adapting itself to acquired habit. Then, again, according to these experiments, alcohol taken on an empty stomach proves to be twice as toxic as when taken with food. Alcohol consumers found this out long ago, for the munching of a biscuit with a glass of wine between meals is a very old and familiar practice. Man seems to have discovered instinctively that food tempers the action of the spirit.

[1] Special Report Series, No. 34. National Health Insurance, Medical Research Committee: The Influence of Alcohol on Manual Work and Neuro-muscular Coördination. London: Published by His Majesty's Stationery Office.

GONOCOCCUS PNEUMONIA.

Dr. Martin Ross,[1] of New York, records the following case, which he regards as one of gonococcus pneumonia. The patient was a girl, aged 16, suffering from an acute exacerbation of an old gonorrhœal infection superimposed upon a dysmenorrhœa. Lobar pneumonia developed and followed an atypical course. The sputum was scanty and milky white in colour, with no trace of blood in it at any time. Pure cultures of Gram-negative, biscuit-shaped diplococci were obtained from the sputum, the blood, and the lung. Post mortem both lungs were found riddled with minute abscesses, there was consolidation of the upper left lobe; in the lower lobe of the right lung there was a large abscess cavity and a smaller abscess in the right upper lobe. The occurrence of gonococcus septicæmia in this case was probably due to the presence of

[1] Medical Record, 1919, xcv., 950-2.

dysmenorrhœa with the damming up of the menstrual flow. In spite of the relative frequency of gonococcus septicæmia with metastases, Ross could only find one other case on record of gonococcus pneumonia, which was reported by von der Bressel in the *Münchener medizinische Wochenschrift* in 1903. The patient, a man aged 32, while under treatment for gonorrhœa developed signs of lobar pneumonia with scanty, milky white, bloodless sputum. Pure cultures of Gram-negative diplococci were obtained from the blood and sputum. In a week's time the temperature fell by lysis, and complete resolution took place on the eighteenth day.

THE CASE OF BUBONIC PLAGUE IN LIVERPOOL.

THE Ministry of Health make the following announcement concerning the fatal case of bubonic plague in Liverpool to which reference was made in our last week's issue. The patient, a master stevedore and bargeman, was removed to the isolation hospital on July 11th and died on July 19th, but bacteriological confirmation of the fact that he was suffering from plague was not obtained until July 26th. No further cases have occurred. Dead rats have been discovered in the patient's office and in the adjacent premises, but on examination none were ascertained to have plague. A mouse found dead has been proved by bacteriological examination to have suffered from plague. The corporation have undertaken the disinfection of the premises and the destruction and examination of rodents found in them. One of the medical officers of the Ministry is engaged on a detailed investigation of all the circumstances of the case.

THE NEW PUBLIC HEALTH ACT IN SOUTH AFRICA: CONSCIENCE CLAUSE ABOLISHED.

THE new Public Health Act, No. 36, 1919, of the Union of South Africa, was recently promulgated at Capetown. The Governor-General has, under the Act, appointed Sir Thomas Watt, K.C.M.G., Minister of the Interior, to hold the portfolio and administer the Department of Public Health in addition to the Department of the Interior and the Public Works Department. It is also announced that from July 1st, and until further notice, the Department of Public Health established under Section 2 of the Act administers all matters relating to (*a*) public health, (*b*) adulteration of food and drugs, (*c*) district surgeons, and (*d*) medical councils and pharmacy boards, instead of, as heretofore, the Department of the Interior. The Public Health Bill in its passage through the Senate was subjected to one radical alteration—the deletion of the antivaccination conscience clause—and this alteration was accepted by the Assembly and has become law. Sir Thomas Watt submitted to the Senate, when the conscience clause was under consideration on June 2nd, that a reasonable case had been made out for such a clause, but the Senate deleted the clause by 13 votes to 8. Eight days later the Assembly accepted the deletion of the conscience clause by 48 to 26, although it had been originally carried by the popular House by 61 votes to 19. One argument that evidently weighed with the Assembly was that under a conscience clause there would be nothing to prevent whole tribes of natives or coloured people raising objections to vaccination. Sir Thomas Watt also stated that in the six years before the war there were only four cases of small-pox in Germany, where vaccination was compulsory "even in the case of people with a conscience." According to Dr. John Hewat's statement in the Senate, 40 per cent. of the people in the Orange Free State are unvaccinated, and the senior elected member of the Colonial Medical Council is not likely to make loose assertions on such a matter. The Act also provides for a refund by the Government of 50 per cent. of all expenditure on public health incurred by municipalities, a clause with obvious bearing upon the State treatment of tuberculosis. While the measure was in the Senate Dr. Hewat urged the Government to deal with tuberculosis sanatoria from a national point of view, instead of leaving it to the municipalities to contribute half of the cost. Sir Thomas Watt claimed that the measure went a long way towards the nationalisation of the care of public health. It had been asserted that the Government spent more money on dealing with diseases of stock than on public health, but the Minister declared, on the contrary, that the Government spent £10 on public health as compared with £1 spent on animals. Dr. Hewat said that the cost of the measure was not going to be great—only £80,000 or £100,000 per annum—and appealed to the Government to increase the refund of 50 per cent. on expenditure made by municipalities in connexion with public health. This request being declined by the Minister, Dr. Hewat said he deplored the decision of the Government, especially in reference to the need for tuberculosis sanatoria.

RESECTION OF ANKYLOSED FINGERS.

IN the *Journal de Médecine de Bordeaux* M. H. Lefèvre has called attention to an improved method of treating ankylosed fingers, such as follow bullet wounds, which should prove useful, especially at the present time. These wounds, if they do not lead to immediate amputation, terminate in ankylosis, usually in extension, frequently with the ankylosed finger overriding its neighbour. The overriding is due to partial loss of articular surface, whether condyle or socket. Such ankylosed fingers are useless, subject to numerous injuries, and interfere with the function of the next fingers. The usual treatment is amputation. One day, after amputation of an ankylosed finger, which he considered useless, M. Lefèvre asked himself, Can nothing better be done? On dissection he found the flexor tendons intact, the extensors adherent to the skin and the bones but without solution of continuity. They had been divided by a shell fragment, but the ends were united by fibrous tissue. Having broken down the ankylosis involving the first interphalangeal joint and freed the tendons, he could, by traction on them, flex and extend the phalanges on one another. He therefore decided to resect the next ankylosed finger that he encountered with the tendons intact. But in three cases in which he operated he could obtain no indication on this point beforehand. Only the operation gave this. Wound of finger-joint is frequently accompanied by articular fracture and suppuration, and the resulting ankylosis by peri-articular lesions. In the end the tendons and soft parts are more or less altered, if they are not initially. Whatever the degree of disability, it is the condition of the tendons that matters. Whether they are ruptured or adherent the result is the same—complete immobility of the phalanges on one another or on the metacarpal bone. Before sacrificing such a

finger M. Lefèvre thinks that the surgeon should make sure by exploratory incision of the state of the tendons and not amputate unless they are irreparable. He relates three cases in which he resected the finger with success. The following may be taken as an illustration. A man, aged 32 years, was wounded on Jan. 17th, 1915. He was admitted to hospital on the 20th with a sloughing wound of the first interphalangeal joint of the right index. At the end of February cicatrisation was complete. In April he came under the care of M. Lefèvre. The joint was ankylosed in extension and the index overrode the middle finger. Radioscopy showed that this was due to loss of the internal condyle of the first phalanx. On the dorsal and internal surface of the finger there was adherent scar. The palmar surface of the second and third phalanges rested on the dorsal surface of the middle finger. The patient could not effect any movement of flexion of the phalanges on one another, or any movement of flexion or extension on the metacarpal bone. He therefore asked for amputation. On April 8th a longitudinal incision down to the bone was made on the external surface of the finger. With a rugine the soft parts were raised from the dorsal and from the palmar surface. The fibrous and osseous tissues constituting the ankylosis were divided. The cartilaginous surfaces had disappeared. In the centre of the glenoid cavity of the second phalanx was a little focus of osteitis with granulations. Curetting was performed and a new cavity was modelled. The external condyle was resected so as to level the end of the bone. With a gouge a new head was modelled. Two sutures were inserted in the fibrous tissues. Adhesions between the skin and the fibrous tissue, which surrounded the extensor tendon, were broken down. The cutaneous wound was sutured. Next day passive movements were begun. On June 26th the patient could completely extend and almost completely flex the finger. He could roll a cigarette and button his clothes. The finger was simply a little shortened. When seen again in February, 1917, he had good use of the finger.

SCIENCE AS MADE IN GERMANY.

EVEN in the days when it was customary to take German scientists at their own valuation doubt would at times arise as to whether or not these gentlemen were quite so altruistic and so devoted to the cult of philosophy for its own sake as they held themselves out to be. A wise commentary on their attitude is contained in an excellent series of articles on the Pan-German Internationale by Mr. Adolphe Smith, which appeared in the *Times* at the end of July. Mr. Smith, whose forcible writing on many subjects of vital importance to medicine is familiar to all readers of THE LANCET, writes as follows:—

"The danger or otherwise of consuming tuberculous meat was of very material importance to the German Agrarian Party, for a large proportion of German cattle was known to be tuberculous. This party held office when at a great international scientific congress it was my good fortune to discover and to denounce intrigues that had for their purpose the adoption of a resolution exonerating the specific germ of bovine tuberculosis. This manœuvre had been promoted by the German delegation and the official representatives of the German Government."

The accuracy of the statement emerges from the report to THE LANCET of the International Congress on Tuberculosis held in 1908 at Washington, and it brings to light an aspect of German duplicity for which, even after the experience of the past five years, we confess that we were unprepared. Mr. Smith's protest against German methods at this Congress was printed in very similar words in our own columns 11 years ago. Those whose memories carry them back to the year 1901 will recall the profound sensation caused by the statement made by Koch before the British Congress on Tuberculosis in reference to this same topic.

"The infection of human beings (by bovine tuberculosis) is a very rare occurrence. I should estimate the extent of infection by the milk and flesh of tuberculous cattle, and the butter made from their milk, as hardly greater than that of hereditary transmission, and I therefore do not deem it advisable to take any measures against it."

It was charitably supposed that the distinguished scientist had slipped into error. No doubt he had, but we may perhaps be forgiven for wondering if the exact nature of the error was correctly diagnosed at the time.

HEREDITY AND MENDELISM IN PTOSIS.

A REMARKABLE family has been discovered in America in which the inheritance of ptosis can be traced through six generations.[1] Living in a sparsely settled country, this family, though seldom intermarrying, have remained in the same district for a century and a quarter. The recorder, Dr. Briggs, of Asheville, North Carolina, gives statistics of 128 members of 23 families (or "sibships," to use Nettleship's term), all descended from one Martin Maney, an emigrant from Dublin and a veteran of the Revolutionary War. In each of these 23 sibships one or more members were affected with ptosis, and, taking them all together, the numbers of the affected and unaffected were exactly equal, 64 of each. The evidence in most cases rested on hearsay and family tradition, but the condition was seen and photographed in six members of the last three generations, and with regard to the others, in the case of such an obvious defect, family tradition can probably be trusted. The equality in numbers between the affected and unaffected points strongly to the inheritance being in accord with the Mendelian theory, although the precise equality in this case must be accidental, for the theory postulates equality not between the number of affected and unaffected developed individuals, but between the number of potential individuals contained in all the germs, both developed and undeveloped, originally possessed by the members of the affected sibships. Perhaps even more striking than the equality in numbers is the fact of the inheritance being continuous in every case but one—i.e., there was no affected individual with both parents normal, and in every case (but one) of both parents being normal none of the progeny were affected. We may, perhaps, suppose that in the exceptional case a slight degree of ptosis had been overlooked by the family; at any rate this is what the recorder suggests (though in that case the equality before mentioned would no longer be exact). To explain the facts on the Mendelian theory it must be assumed that the character of ptosis is a dominant one in relation to the normal character, which is recessive. The ancestor of the first generation was an impure dominant—i.e., he was affected himself with ptosis, but while one-half of his germ cells contained the ptosis factor the other half did not. The result would be that of his children roughly one-half would be affected with ptosis, while the

[1] American Journal of Ophthalmology, June, 1919.

other half, developed from germs completely free from the ptosis character, would be normal. Every affected member of the genealogy would be like the ancestor of the first generation, an impure dominant, and, as the result of a marriage with a normal partner, would transmit the character of ptosis to, roughly, one-half of his or her children, while unaffected members of the genealogy would transmit no taint. This is what happened in the family in question, so far as we can tell from the not very full data supplied. The record is one of extreme interest, and should be compared with the work of the late Mr. Nettleship, whose observations on the bearing of the Mendelian theory on various eye diseases are summed up in his Bowman lecture for 1909.[2] It is here shown that while the facts of some hereditary conditions in humans cannot be interpreted on the Mendelian theory except by the assumption of various modifying influences there are other hereditary conditions in which they can. The best example of the latter is found in hereditary forms of cataract, whether noticed first at birth or in later life. Most cases of senile cataract occur apart from heredity, but there are some families in which there is no doubt that the liability to the disease is inherited, and in these it is very rare to find an affected member one of whose parents was not also affected. In the case of congenital cataract the inheritance is practically always of the continuous type, and in affected families (sibships) a rough approach to equality between affected and non-affected members will be found on the average. The factor causing cataract, therefore, behaves as a dominant towards the normal, and we may predict with some confidence of an affected member of such a family that in the case of children being born to him or her the chance of their inheriting the disease will be an even one, while in the case of a non-affected member of the same family, provided that the second parent is normal, the chance of inheritance is practically nil. Several pedigrees of families with retinitis pigmentosa have also been put on record, and in the majority of them the inheritance is continuous, the disease factor behaving as a dominant; but in some of these pedigrees the inheritance is discontinuous—i.e., interrupted by a healthy generation, and it is possible that in these pedigrees the disease behaves as a recessive. In the case of some other diseases—e.g., Leber's hereditary optic atrophy—the interpretation of the facts is complicated by a new factor—sex limitation. It is only when there are no complicating factors that we can expect to find the Mendelian theory illustrated, but the instances where this has already been done to some extent are sufficiently numerous to encourage those interested in the subject who have the opportunity of collecting pedigrees bearing on the point to persevere.

[2] Trans. Ophthalmological Society, vol. xxix.

THE POTASSIUM COMPOUNDS ORDER.—By an Order issued by the Minister of Munitions dated July 31st, 1919, the operation of the Potassium Compounds Order, 1917, as modified by an Order (Partial Suspension) issued in 1919, is suspended on and after August 1st, 1919, until further notice. The original Order set forth that no person may offer to purchase or take delivery of certain potassium compounds except in accordance with the terms of a licence restricting the quantities permitted to be dealt with. Shorn of legal verbiage, the new Order means that the restrictions then indicated are now removed, and it is cited as the Potassium Compounds (Complete Suspension) Order, 1919.

A CONFERENCE ON PEDIATRICS.

I.—THE MEDICAL ASPECT.

FOR some time past the subject of pediatrics has been occupying the minds of those who have at heart the health and welfare of infants and young children. More especially have they been concerned with the question of the teaching of the normal physiology as well as the pathological conditions of childhood to medical students, for it is said that the newly qualified practitioner is turned out with some knowledge of disease as it occurs in children, none of the healthy child, and the haziest notions about the feeding of infants.

An informal conference was held last spring to consider generally the subject of pediatrics, under the chairmanship of Sir GEORGE NEWMAN, K.C.B. Advantage was taken of the presence in this country of specialists from America and the colonies to ascertain the results of their experience of maternity and child welfare in relation to the medical curriculum. The conference did not receive at the time the attention that it deserved.

Dr. W. R. RAMSEY, associate professor of diseases of children, University of Minnesota, described

The Position of Pediatrics at the University of Minnesota.

Here there is a separate department with 30 beds, a whole-time professor at the head, and an associate professor and staff of clinical assistants, most of whom are half-time men. Until four or five years ago pediatrics was a separate professorship, but was under the department of medicine. It was soon realised that the subject must be taught intensively, and that to teach a subject intensively there must be a separate department. In Minnesota there is very close coöperation between pediatrics and obstetrics. Both departments are on the same floor, and as soon as the cord is tied the child is passed over directly to the department of pediatrics. The normal infant is regarded as of vital importance in the teaching of the student, for it is realised that if he knows the normal infant thoroughly he quickly recognises the abnormal one. Dr. Ramsey mentions three fallacies which are still prevalent amongst medical men: (1) that the baby must be bathed immediately after birth; (2) that the baby's mouth must be swabbed out daily; and (3) that a dose of castor-oil should be given on the third day. Dr. Ramsey also remarked on the many and various opinions which were rife on the subjects of infant feeding and hygiene. In the United States it was found necessary to appoint a commission of representative pediatricians to formulate a scheme to which all might subscribe. As the result a pamphlet was drawn up and issued by the Government in many hundreds of thousands. The findings of these men are now accepted as the basis for a uniform propaganda for child feeding and general hygiene to be applied to children.

The Teaching of Pediatrics in Canada.

Dr. G. S. STRATHY (Lieutenant-Colonel, C.A.M.C.), assistant physician, Hospital for Sick Children, Toronto, described the condition of affairs in that city as it was when he was there four years ago. The teaching of pediatrics, he said, had changed considerably in Toronto in the last decade.

About ten years ago the teaching of this subject was put in special hands and taken up from two points of view—the teaching of medical people and the teaching of the public. The former is divided into two parts—the teaching of the medical student and the teaching of the practitioner. The student has had to undergo a five years' training, but this is now to be increased to six years. In the fifth year there are practically no lectures to attend, all the time being spent in the wards and laboratories. Each student gave three months to specialities, six weeks of which was given to pediatrics. He attended for two hours a day on three days a week. The Children's Hospital in Toronto contains 150 beds, 50 of them being devoted to children under a year. Some of the students live in the hospital and assist the house staff in their work; all attend the out-patient clinic, weighing the babies week by week and, if necessary, following them up in their own homes. At the Hospital for Sick Children the pediatrics division is responsible for the children from birth to 18 months, the

medical division from 18 months to 14 years. The education of the practitioners is largely done in association with the municipal authorities.

Dr. J. G. ADAMI, professor of pathology, McGill University, Montreal, gave an account of Canadian provisions in general, Canada, as he said, holding a half-way position through having partly British and partly United States influences acting upon it, and being sensitive to both. Ever since the McGill University was opened in 1824 the medical school has followed the British system of having the free entry of the students into the wards, bedside teaching in maternity work, as well as in medicine and surgery, being a striking characteristic. In pediatrics there is a professor, three lecturers, and two demonstrators, the size of the staff being due to the fact that there are out-patient clinics for children at both of the two main hospitals attached to the University, the Royal Victoria and the Montreal General Hospitals, as well as at the Maternity Hospital. In all these pediatrics is taught. An extra year is now being added to the curriculum, and still more work on this subject will be done. According to the McGill Calendar for the 1916-17 session—

"A didactic course on the diseases of infancy and childhood, including the feeding of infants, is given during the session to students of the fourth year. Clinical and didactic lectures are given on diseases of the new born at the Montreal Maternity Hospital. In the Montreal General and Royal Victoria Hospitals weekly clinical lectures and ward demonstrations on diseases of childhood will be given to students of the fifth year, and groups of students in rotation will be assigned work in connexion with the out-patient children's departments of both hospitals. The new Foundling and Baby Hospital, which has recently been opened, with a capacity of 100 beds, will be utilised during the session for a series of demonstrations in infant feeding."

An extraordinarily strong point is made of infant feeding. In the Maternity Hospital the children are taken away from their mothers as soon as they are born, and those infants are looked after mainly by the pediatricians, so much so that one of the leading obstetricians absolutely refuses to see the child. He adopts the "by-product" idea, and says that his whole concern is with the mother, to see that she is well through maternity, and that the child should be, from the first moment of its life, in the hands of the physician who is going to look after it during the next two or three years.

A Children's Department at Guy's Hospital.

Dr. H. C. CAMERON described the scheme for a complete children's department as accepted by the governors of Guy's Hospital and now in process of completion. It is best described in his own words:—

The children's wards, containing about 50 cots, will be in close proximity to a lying-in ward of 20 beds. The infants born in the lying-in ward will be under the care of an assistant, who will act under the joint control of the obstetric surgeons and myself. The Salomon's Centre for Infant Welfare is housed in a building adjoining the hospital, and is approaching completion. It will be conducted by assistants acting under my control. The centre will undertake the ante-natal care of the two to three thousand expectant mothers who apply each year to the hospital for assistance in childbirth. These births are attended in part by the students of Guy's Hospital, and in part by the pupil-midwives of the midwifery school attached to the hospital, in each case under the necessary supervision. The mothers all live in an area which is situated in the boroughs of Bermondsey, Southwark and Lambeth, and our arrangements have the approval of the medical officers of health concerned. In this area there are some 12 other infant centres at work, and the Salomon's centre has entered into arrangements with these centres to cover the whole area completely, so that every child is sent to the centre which is most conveniently situated to its home. The Salomon's centre, therefore, although it conducts the ante-natal work for the whole area, restricts its post-natal work to a small district in the immediate neighbourhood of the hospital.

The out-patient children's department has made arrangements to place the resources of the hospital both for diagnosis and treatment at the disposal of all these centres. In the Salomon's centre there will be a resident superintendent and six resident health visitors. They will be assisted in the work by the pupil-midwives, and ultimately, it is hoped, by students working for a diploma in infant welfare. The medical students of Guy's Hospital will have opportunities of studying the work and appreciating its methods and objects. An arrangement has just been made by which all students will spend three months in the children's department, passing into it immediately after three months spent in the special study of midwifery and the diseases of women, and I feel that with these arrangements it will be possible to make the instruction sufficiently comprehensive so that it may include the study of the newly born and of the normal child as well as the study of sick children.

Pediatrics in the Medical Curriculum.

Dr. Cameron points out that one of the difficulties which beset the teacher in his endeavour to give the student a sufficient training in pediatrics is that the subject is a voluntary one, and there is no set examination of his knowledge as part of the final examination. The training should be compulsory, and an examination must be held which will demand that the student shows the same knowledge of infant management and hygiene as is expected of him in his answers on morbid anatomy and clinical symptoms. In order to afford time for the amount of study necessary Dr. Cameron suggested that the curriculum should be relieved on the anatomical detail side and on the surgical assistance side. Something might also be done in cutting out a good deal of bacteriological technique. He urged that the University of London should grant an M.D. degree in pediatrics, as is done now in midwifery and diseases of women.

As the CHAIRMAN said concisely, Dr. Cameron suggests (1) that a pediatric department is necessary in every medical school; (2) in this department every student shall be taught compulsorily for three months; and (3) every student shall have a special and separate examination in pediatrics.

Dr. J. S. FAIRBAIRN pointed out that any suggestions with regard to examinations, in order to be effective, must come from the General Medical Council. The examination system should be arranged to meet the new conditions of things; every medical school should have a complete centre; the student should take the midwifery course and, if possible, go straight on from midwifery into pediatrics, watch the life and health of the infant whose intra-uterine development and birth have hitherto been his care, through its breast-feeding and weaning. If the student does that he gets a complete picture of the whole thing from the preventive medicine point of view. It is the normal infant that should be taught to the student. The pediatrician should approach the subject from the standpoint of physiology rather than of pathology.

Dr. EARDLEY HOLLAND was strongly in favour of the infant being handed over to the pediatrician for the purpose of teaching and research in the hospitals and medical schools. If the obstetrician has to look after the infant and to study it intensively, he must give up gynæcology; he cannot do both. He must either be an obstetrician and pediatrician, or he must be an obstetrician and gynæcologist. But obstetrics ought not to be separated from gynæcology. It is agreed that they are inseparable subjects. Dr. Holland considers that, except in a few chosen places, the teaching of obstetrics is exceedingly badly done. As he says:—

Nearly all the lying-in beds for teaching are allocated to the teaching of the midwife, and the student is left out in the cold. It is absolutely essential that lying-in beds in the general hospitals should be established, and that it should be made obligatory upon the student to do lying in work in a ward. I mention this because it is closely connected with pediatrics; for it means the study of the fœtus, the causes of fœtal death, the relation of the fœtus to the infant, injuries received by the fœtus, and the diseases transmitted to the fœtus during pregnancy. I feel that as obstetricians we have very little more interest in the infant than is included in the fœtal stage. The part that should be played by the obstetrician in infant welfare is to look after the fœtus; to preserve it during pregnancy from transmitted disease, and to preserve it during labour from the injuries it may receive during its passage through the birth-canal. As soon as the establishment of pulmonary respiration has announced the fact that the metamorphosis from fœtus to infant is complete, he will hand over the infant to his pediatric colleague, asking the latter to note that it has been delivered to him in good condition.

It has only been possible, so far, to consider the opinions which were brought forward by some of the members of the Conference on the teaching of the medical student. The following is an account of the discussion of the social aspect.

II.—THE SOCIAL ASPECT.

The Importance of Breast Feeding.

Dr. W. R. RAMSEY laid stress on the importance of breast feeding, and described the change which had lately taken place in American opinion, both lay and medical. A few years ago, he said, not more than 30 to 40 per cent. of American women nursed their children. The country was flooded with literature on patent foods, which was sent to women not only after the baby was born, but long before, pointing out the simplicity of artificial feeding. Doctors and nurses became imbued with the same opinion, and as a result the public thought that breast feeding was practically an impossible thing. At the present time in many communities 75 to 80 per cent. of even well-to-do women nurse their babies and are proud of it, instead of regarding it as a disgrace. As he puts it, "they discuss it at their circles and their card parties, and go home promptly to nurse their babies." In order to eradicate the heresies which have been handed down from time immemorial we must first educate the doctors and nurses, and then the public will become educated; or else we must educate the public first, and the doctors will be compelled to follow suit.

Infant Welfare in Toronto.

Lieutenant-Colonel STRATHY described the state of affairs in Toronto. The healthy babies are looked after at milk depôts, each serving a district, of which there are 16 in Toronto, for which the municipality is responsible. To each of these depôts a practitioner is attached, who attends twice a week. The city authorities supply the premises for the clinics, and the nurses who attend there and who follow up the children. Within 10 days of the birth of the baby, whether the family be wealthy or poor, the nurse from the City Hall calls at the house to offer help or advice to the mother. In the poorer districts she is usually welcomed and asked to call again. The mother is encouraged to go to the depôt and have the baby weighed each week, and it is found now that she can do this without hurting the feelings of the practitioner who is looking after that baby, though at first they had to be careful not to tread on the toes of local practitioners. As long as the baby is healthy and advice is needed only in the matter of feeding, it is treated at the depôt, but sick babies are sent to the children's hospital with a card. A card index is kept for all babies, and after treatment at the out-patient department of the hospital the baby is sent back to the depôt, together with its card, showing all the treatment it has had. A nurse is always present with the doctor who holds the clinic, and will always supply a report of the home conditions when required. For those who attend the out-patient clinic any home treatment, such as washing out the stomach, can be carried out by the nurse; instructions go to the City Hall to the head nurse, and a nurse is instructed to go and do it. There are about 150 nurses carrying on this work who have graduated at the children's hospital.

Infantile Tuberculosis in Italy.

Captain R. A. BOLT gave a brief outline of some of the findings of a Commission which was sent to look into the tuberculosis situation in Italy, and which was part of the American Red Cross in Italy. It was found that tuberculosis was very closely related to other problems, and the report which they issued, which was drawn up by Captain Knud Stonman, statistician of the Commission, is chiefly concerned with infantile mortality in Italy during the war and with the child-welfare aspect of the problem. In Italy, prior to the war, the infant mortality rate was gradually being lowered as industrial prosperity increased, especially in those places where serious efforts in child welfare had been made. The Italians had developed a system of institutions through their pediatricians which in most places met the immediate needs of sick children, had recognised the need for a good milk-supply for growing children, and, through a system of marine and mountain colonies, had provided recreation and outdoor life for those who were weak and predisposed to tuberculosis. In a number of medical centres of Italy, prior to the war, special instruction was given in pediatric clinics, but only in a few was the socio-economic side of child-welfare work emphasised and opportunity given to the students to do practical work in milk stations, consultations, and infant welfare centres. In Italy breast feeding of infants has always been in favour, and in the north from 85 to 90 per cent. of the children are breast-fed for one year at least, and in the south from 90 to 95 per cent. The midwife service is satisfactory, midwives being required to take a two years' course of training in medical centres, after which they take their diploma. In Italy the incidence of puerperal infection is comparatively small, and the amount of ophthalmia neonatorum relatively so. On the outbreak of war some of the obstetricians and pediatricians were drafted into war service and a number of children's hospitals were utilised for war purposes. The birth-rate increased up to about nine months after mobilisation, and since that time there has been a steady and, in some places, an alarming decrease, the national birth-rate falling from about 30·5 per 1000 at the outbreak of war to something like 18 or 16. With this decrease in the birth-rate there has been an increase in infant mortality, especially during the winter and summer, most marked in January, February, and March, and in June, July, and August. The death-rate of children from 1 to 5 years has increased much more rapidly, which has been attributed to the unsuitable food given to young children after weaning owing to the difficulty of procuring suitable food because of the high prices. The death-rate from influenza was particularly high amongst babies and young children, young women between 20 and 30 years of age, and pregnant women. Abortion occurred very readily.

In the North of Italy considerable progress has been made in the organisation of infant welfare work, and although the birth-rate is lower than that of the Adriatic coast and in the south, they have managed in the large centres to reduce the infant mortality rate, so that there the actual saving in life has probably been greater. The smaller towns along the Adriatic have suffered severely from the cutting off of trade and fishing, and of the influx of the rural population into the cities. Women were drawn into the various industries, and often left their children to be looked after by those who did not know how to direct the feeding properly. There has been, in consequence, a considerable increase in deaths from gastro-intestinal diseases in the provinces along the Adriatic coast from Rimini to Lecce. During the war there has also been a considerable increase in the number of deaths from tuberculosis, and tuberculosis among children under 10 years of age is also on the increase. The increased cost has prohibited the middle classes from procuring wet nurses. The death-rate among the wet nurses' own babies has also been high. There has, apparently, been no increase in the number of foundling asylums and illegitimate babies. The mortality, however, among the illegitimate babies has been about twice that among the legitimate children, and under the best conditions in the foundling asylums the mortality has been greater. In order to meet all these problems milk-distributing stations and economic kitchens have been established in every large centre, and considerable amounts of condensed milk have been distributed by the Red Cross. Clothes and institutional care have also been provided, but there has never been in Italy any enthusiasm for health visitors, and up to the present time the people neither understand nor appreciate the importance of trained health visitors. During the war a considerable number of intelligent, well-to-do women entered the nursing service in the Army with the Italian and American Red Cross, and have had their eyes opened to the needs of the civil population, especially to the care of the babies. From this group of women it is hoped to gather nuclei here and there for instruction in public health nursing. The coördination of all the child-welfare activities in various centres must also take place, and in order to become effective a national organisation, with an executive committee representing various types of work for children, should be organised. In Italy there is growing a healthy idealism for maternity and child welfare. The men and women with children are looked upon as having real assets, economic, social, and religious. The committee has been able to supply nurses to give secretarial help and to help with regard to publicity.

The Position in England.

Speaking of the situation in England, Captain Bolt considered that three things would have to be done. The most important was the education of the medical student to the needs of infant-welfare work through the pediatric departments. The next was the training of health visitors along broad social, economic, and nursing lines, though not necessarily very intensive. Thirdly, there was the need of educating the growing generation of mothers to the necessity for this type of work, which could most easily be done in the upper grades of the schools. In Cleveland a scheme was introduced whereby elementary courses on infant hygiene were given, school nurses taking one course and domestic science teachers the other. Mothercraft in schools should be taught not by regular day school teachers, but by those who are specially familiar with the health side of child problems. The health visitor can teach the importance of proper feeding and the proper care of milk, can impress upon the school children why the babies are dying, and can urge the necessity for breast feeding. Teaching should be given to children between the ages of 12 and 14, and should be compulsory. The health visitor should have a thorough training in general nursing before she takes up her public health duties. In Cleveland all the nurses connected with the health department have had a general hospital training, a special training in tuberculosis dispensaries, sanatoriums, &c., or in infant welfare centres, children's hospitals, and dispensaries. From an infant-welfare point of view, social service should receive more stress than long preliminary hospital training.

A Baby Hospital in New Zealand.

Dr. TRUBY KING described what had been done in New Zealand. A small hospital was established solely as a baby hospital, and nurses were trained to fit them for teaching and for the care of the mother and child throughout the whole country. The Society for the Health of Women and Children was started as a purely voluntary organisation; monthly reports are issued to the Public Health Department, and the society has worked in loyal coöperation with them. There has been a growing recognition upon the part of the public authority. At first there was no grant towards the voluntary funds of the society, but now the Government contributes 24*s.* for every pound raised voluntarily for the salaries of mothercraft nurses, and grants generous annual subsidies towards the support of the hospitals established by the organisation. The nurses are allowed to travel free of cost over the State-owned railways, and the municipalities give them free travelling over the municipal tramways.

Resolutions Approved.

The following important resolutions were unanimously passed:—

(1) That every effort should be made to impress on the whole community the supreme importance of breast feeding, for the sake of both mother and child; that at present over-feeding of the baby, especially in the first fortnight of life, is one of the commonest and most serious mistakes of nursing mothers, often upsetting the child and leading to the early abandonment of suckling. (2) This tendency can be best counteracted by a general recognition of the benefit of greater regularity and lessened frequency of feeding than is customary. (3) With very few exceptions nursing only every four hours from birth is best for mother and child, though in a few cases more frequent feeding may be desirable. (4) That in general there should be an interval of seven or eight hours between the last feeding at night and the first feeding in the morning. (5) That every medical student preparing for a registrable qualification shall receive adequate teaching in the subjects of infancy and childhood in health and disease; that attendance in a department where instruction is given in these subjects should be compulsory for a period of not less than three months and that some special part of the final examination in medicine should be devoted to these subjects. (6) That, as far as practicable, this study shall follow upon, and be coordinated with, a satisfactory course in obstetrics and gynæcology, and should be made available for post-graduate students; that the present training in obstetrics leaves much to be desired, especially in regard to the lack of facilities for bedside teaching in midwifery. (7) Great public advantage would result from a larger measure of uniformity in the advice given by public authorities and others in respect of maternity, infant, and child welfare; the only way in which we think this can be secured is by obtaining a written statement from a body of experts. (8) Both practical and theoretical instruction in infant hygiene should form a part of the training of midwives and of all persons engaged by public authorities in infant welfare work. (9) That maternity nursing should only be undertaken by competent and adequately trained persons, preferably by qualified midwives.

URBAN VITAL STATISTICS.

(Week ended August 2nd, 1919.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality, which had been 10·1, 9·0, and 10·3 in the three preceding weeks, fell to 9·7 per 1000. In London, with a population slightly exceeding 4,000,000 persons, the annual rate was 9·5, or 1·9 per 1000 below that recorded in the previous week, while among the remaining towns it ranged from 2·7 in Acton, 2·9 in Carlisle, and 4·0 in Rotherham, to 15·5 in Stockton-on-Tees, 16·3 in Southport, and 17·2 in Exeter. The principal epidemic diseases caused 154 deaths, which corresponded to an annual rate of 0·5 per 1000, and included 69 from infantile diarrhœa, 45 from diphtheria, 20 from measles, 10 from whooping-cough, 6 from enteric fever, and 4 from scarlet fever. Measles caused a death-rate of 1·2 in Newcastle-upon-Tyne. There were 2 cases of small-pox, 1538 of scarlet fever, and 1117 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 2, 1526, and 1140 respectively at the end of the previous week. The causes of 31 deaths in the 96 towns were uncertified, of which 5 were registered in Birmingham, 4 each in Liverpool and South Shields, and 3 each in London and Manchester.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality, which had been 11·0, 10·6, and 11·1 in the three preceding weeks, fell to 10·6 per 1000. The 227 deaths in Glasgow corresponded to an annual rate of 10·6 per 1000, and included 6 from measles, 5 from infantile diarrhœa, 2 from whooping-cough, and 1 each from enteric fever and diphtheria. The 72 deaths in Edinburgh were equal to a rate of 11·2 per 1000, and included 4 from measles and 1 each from scarlet fever, whooping-cough, and diphtheria.

Irish Towns.—The 92 deaths in Dublin corresponded to an annual rate of 11·8, or 0·3 per 1000 above that recorded in the previous week, and included 4 from infantile diarrhœa. The 79 deaths in Belfast were equal to a rate of 10·3 per 1000, and included 2 from infantile diarrhœa and 1 from diphtheria.

THE King has approved the retirement of Lieut.-Col. F. P. Maynard and Lieut.-Col. S. H. Henderson from the Indian Medical Service.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.

Comitia of the College.

AN ordinary Comitia of the College was held on July 31st, Sir NORMAN MOORE, the President, being in the chair.

On the report of the Censor's Board it was resolved—

"That Arthur Edward Gladstone be declared to be no longer a Licentiate of the College, that he forfeit all rights and privileges of a Licentiate, and that his name be removed from the List of Licentiates during the pleasure of the College."

Dr. Frederic Percival Mackie was admitted to the Fellowship of the College.

The following, having passed the required examination, were admitted as Members:—

Thomas Beaton, M.D. Lond., L.R.C.P.; Cecil Clinton Birchard, M.B. Toronto; Reginald St. George S. Bond, M.B. Edin.; Maurice Davidson, M.D. Oxf., L.R.C.P.; Alan Worsley Holmes a Court, M.B. Sydney; Arthur Edwin Horn, M.D. Lond., L.R.C.P.; Sydney Fancourt McDonald, M.D. Melb.; Douglas Murray McWhae, M.D. Melb.; Thomas Archibald Malloch, M.D. McGill; Ludlow Murcott Moody, M.B. Lond., L.R.C.P.; Julian Lionel Preston, M.B. Lond., L.R.C.P.; Archibald Cathcart Roxburgh, M.B. Camb., L.R.C.P.; Joseph Wilkie Scott, M.D. Glasg.; Frank Shufflebotham, M.D. Camb.; Eric Clarence Spaar, M.D. Lond.; Robert Maxwell Trotter, M.D. Aberd.; William Balcombe Winton, M.D. Camb.

Licences to practise physic were granted to 78 candidates who, having conformed to the by-laws and regulations, had passed the required examinations. Diplomas in Public Health were granted, in conjunction with the Royal College of Physicians, to the following candidates who were found by the Examiners to be qualified:—

Lionel Danyers Bailey, L.R.C.P., M.R.C.S., St. George's; Malcolm Barker, L.R.C.P., M.R.C.S., King's College; Cyril Douglas Day, L.M.S.S.A. Lond., Cambridge and St. Bart.'s; Herman Falk (Major, I.M.S.), L.R.C.P., M.R.C.S., M.B., B.C. Cantab., Cambridge and St. Thomas's; Walter Henry Grace, M.B., B.S. Lond., M.R.C.P., M.R.C.S., Guy's; Mervyn John Holmes, M.B., B.S. (Melbourne, Australia), University College; Tam Legge, L.R.C.P., M.R.C.S., University College; Richard Douglas Passey, M.C., M.B., B.S. Lond., Guy's; Eva Louise Cairns Roberts, M.B., Ch.B. Manch., Manchester and King's College; William Leslie Webb, M.B., B.S. Lond., L.R.C.P., M.R.C.S., Guy's; Harold Edward Whittingham, M.B., Ch.B. Glasg., Glasgow and University College; John Pryce Williams, L.R.C.P., M.R.C.S., St. Mary's and King's College.

The following appointments were made, and the newly elected officers gave their faith to the College:—

Censors.—Sir Wilmot P. Herringham, Sir Humphry D. Rolleston, Dr. Raymond H. P. Crawfurd, Sir John Rose Bradford.

Treasurer.—Sir Dyce Duckworth.

Registrar.—Dr. Joseph Arderne Ormerod.

Harveian Librarian.—Dr. T. H. Arnold Chaplin.

Members of the Library Committee.—Dr. Hector W. G. Mackenzie, Dr. Dawson Williams, Dr. Arthur Francis Voelcker, Dr. Herbert Ritchie Spencer.

Curators of the Museum.—Dr. John Mitchell Bruce, Sir Seymour John Sharkey, Dr. Frederick William Andrewes, Dr. William Hunter.

Finance Committee.—Dr. Sidney Philip Phillips, Dr. Arthur Templer Davies, Dr. Herbert Ritchie Spencer.

Examiners.—Chemistry: Mr. William Holdsworth Hurtley, Mr. Henry Rondel Le Sueur. Physics: Mr. James Hancock Brinkworth, Mr. Alfred Henry Fison. Practical Pharmacy: Dr. Robert Arthur Young, Dr. David Forsyth, Dr. William Mitchell Stevens, Dr. James Andrew Gunn, Dr. Edward Mellanby. Physiology: Dr. David Henriques de Souza, Mr. John Smyth Macdonald. Anatomy: Dr. Edward Barclay-Smith. Medical Anatomy and Principles and Practice of Medicine: Dr. James Calvert, Dr. William Hunter, Dr. William Aldren Turner, Dr. Horace George Turney, Dr. John Walter Carr, Dr. John Fawcett, Dr. James Stansfield Collier, Dr. Robert Hutchison, Dr. Frederick John Poynton, Dr. Arthur John Hall. Midwifery and Diseases peculiar to Women: Dr. George Francis Blacker, Dr. Henry Russell Andrews, Dr. Hugh J. M. Playfair, Dr. William F. Victor Bonney, Mr. Harold Chapple.

Public Health.—Part I.: Mr. John Henry Ryffel. Part II.: Dr. Edward William Hope.

Tropical Medicine.—Dr. John C. Grant Ledingham, Dr. John Brian Christopherson.

Murchison Scholarship.—Dr. John Fawcett, Dr. Alfred Ernest Russell.

Communications were received from (1) the secretary of the Royal College of Surgeons reporting proceedings of the Council of that College upon May 8th, June 12th, and July 11th last, respectively; (2) Dr. E. A. Gates asking to be allowed to resign temporarily his Diploma of Membership—this was agreed; (3) Lady Allchin offering to the College a portrait of the late Sir William Allchin, by Sir Luke Fildes, R.A.—the thanks of the College were accorded to Lady Allchin. On the recommendation of the Council the Baly medal was awarded to Dr. Leonard Hill, F.R.S. The report of the Imperial Cancer Research Fund was received. Dr. F. W. Andrewes was re-elected a member of the Executive Committee of the Imperial Cancer Research Fund. Sir William Church and Sir Thomas Barlow were reappointed members of the Executive Committee of the Imperial Cancer Research Fund, on the recommendation of the General Committee of the Fund. The President informed the College that the Executive Committee of the Streatfeild Scholarship

have awarded the scholarship to Dr. F. G. Cawston, of Durban, Natal. Reports were received from the representative of the College on the General Medical Council and from Sir George Savage on the Chelsea Physic Garden.

Reports from the Committee of Management of the Conjoint Examining Board.

The report of the Committee of Management, dated June 3rd last, contained the following recommendations:—

1. The Committee recommend that the following schools be added to the list of institutions recognised by the Board for instruction in Chemistry and Physics—namely, the Central Secondary School, Sheffield, and the Grammar School, Barnstaple.

2. The Committee recommend that the following school be recognised for instruction in Chemistry, Physics, and Biology—namely, St. Paul's School for Girls, West Kensington.

3. The Committee recommend that the following institution, which is already recognised for instruction in Chemistry and Physics, be also recognised for instruction in Biology—namely, Municipal College, Grimsby.

A report of the Committee of Management, dated July 8th, was also received dealing with—

1. The report of the Council of British Ophthalmologists.

2. The substitution of an examination in Materia Medica and Pharmacology for the present examination in Practical Pharmacy.

3. The recognition of schools for instruction in Chemistry and Physics.

4. The recognition of the course of instruction in Pharmacology at the University of Cape Town.

1. The report of the Council of the British Ophthalmologists on the teaching and examination of medical students in ophthalmology concludes with the following recommendations:—

(1) No student shall be admitted to the Final Examination qualifying to practise medicine unless he has attended an ophthalmic clinic for not less than six hours a week during a period of three months, and has attended a course of systematic instruction in ophthalmology. (2) No student shall be considered to have passed the qualifying examination unless he has shown a sound knowledge of practical ophthalmology in an examination conducted by ophthalmic surgeons.

In referring this report to the Committee the Council of the Royal College of Surgeons of England also forwarded a resolution stating that in their opinion it is not desirable to institute a special examination in ophthalmology conducted by ophthalmic surgeons. The Committee of Management agree with this resolution, and have therefore considered whether any alteration in the Regulation relating to instruction in ophthalmology is desirable. In connexion with this subject the following resolution, adopted by the General Medical Council on May 31st, 1919, was also considered:—

"That every student should be required to attend a course of practical instruction in ophthalmology of not less than ten weeks' duration, and that no student should be admitted to the Final Examination unless he presents a certificate to the effect that he has attended such a course regularly, and that his work in connexion therewith has reached a satisfactory standard."

The present Regulation of the Conjoint Board, Section II. XXI. 6, requires a certificate—

"Of having attended clinical instruction in ophthalmic surgery in the ophthalmic department of a recognised general hospital, or at an ophthalmic hospital recognised for the purpose by the Examining Board in England, during not less than three months."

The Committee of Management of the Royal College of Physicians of London are of opinion—

That the present Regulation Section II. XXI. 6 covers the resolution of the General Medical Council, and that this Regulation requires a sufficient period of special instruction in ophthalmology; that the provisions of the Regulations Section I., paragraphs VIII. and IX., enable the teachers of ophthalmology in the medical schools and hospitals to hold class examinations and to institute such conditions for attendance on the course as they consider desirable before certificates of attendance are granted by them.

For these reasons the Committee recommend that no alteration be made in the present Regulation relating to instruction and examination in ophthalmology.

2. In the year 1915 the Royal Colleges decided to substitute an "examination in Materia Medica and Pharmacology" for the present examination in Practical Pharmacy, but agreed that the new examination should not come into force until January, 1918, and then only if the war be ended. The Committee of Management are of opinion that the time has now arrived when this new examination should be instituted, and they have accordingly adopted the following recommendations to the Royal Colleges, viz.:—

1. That notice be given to the medical schools and by advertisement in the medical journals that an examination in Materia Medica and Pharmacology will be substituted for the examination in Practical Pharmacy. 2. That the examination in Materia Medica and Pharmacology be taken by all candidates who have not completed the First Examination, including Practical Pharmacy, by May 1st, 1920. 3. That no alteration in the fees payable on the first admission to the First and Second Examinations is necessary. 4. That the fee for *re-examination* in Materia Medica and Pharmacology be 3 guineas. 5. That the capitation fee paid to the examiners be raised from 10*s.* to 16*s.* (It is estimated that each examiner will receive at least £40 a year.) 6. That the revised Regulations, with the new synopsis already authorised by the Royal Colleges, be issued.

7. That in addition to the revision in the Regulations already authorised, paragraphs II., III., and IV. of Section III. of the Regulations relating to the conditions of admission to examination of members of English, Scottish, Colonial Indian, and foreign Universities be modified so as to admit of such students presenting themselves for the Final Examination at the expiration of two years from the date of passing in anatomy and physiology at their Universities, provided the curriculum of professional study has been completed, notwithstanding that the corresponding examination at their Universities in pharmacology and materia medica may have been passed in the third or fourth year.

3. The Committee recommend that the following schools be added to the list of institutions recognised by the Board for instruction in chemistry and physics—namely: King's School, Rochester; the Grammar School, Normanton.

4. The Committee recommend that the course of instruction in pharmacology and practical pharmacology in the Medical Department of the University of Cape Town be recognised by the Board.

The Services.

ARMY MEDICAL SERVICE.

Major-General Sir Menus W. O'Keefe, K.C.M.G., C.B., retires on retired pay.

Major-General Sir M. P. C. Holt, K.C.B., K.C.M.G., D.S.O., is appointed Honorary Surgeon to the King, vice Major-General (temp. Lieut.-General) Sir W. Babtie, V.C., K.C.M.G., C.B., K.H.S.

ROYAL ARMY MEDICAL CORPS.

Lieut.-Cols. L. F. F. Winslow and R. C. Lewis retire on retired pay.

Major and Bt. Lieut.-Col. C. R. Sylvester-Bradley and Capt. A. C. Hammond-Searle relinquish the acting rank of Lieutenant-Colonel on re-posting.

Major A. E. Smithson is placed on retired pay.

Captains to be Majors: A. W. Howlett, G. F. Dawson, H. S. Dickson, W. A. Spong, H. P. Hart, J. C. L. Hingston, A. Hendry, R. E. Todd, G. Petit, and W. R. O'Farrell; (acting Majors) J. A. Renshaw, D. B. McGrigor, R. F. O'T. Dickinson, A. E. B. Jones, J. R. Lloyd, J. F. Grant, and C. Kelly; (acting Lieut.-Cols.) R. G. S. Gregg and B. A. Odlum; (Bt. Major) F. T. Dowling.

Temporary Captains relinquishing the acting rank of Major: R. S. Dickie (on re-posting), T. E. R. Branch.

Capt. D. Forsyth Panton, from Special Reserve, to be Lieutenant and to be Temporary Captain.

Temp. Capt. A. E. S. Pringle-Pattison to be Captain.

Capt. H. G. Trayer resigns his commission.

Officers relinquishing their commissions:—Temp. Lieut.-Col. H. L. Eason retains rank of Lieutenant-Colonel. Temporary Majors retaining the rank of Major: C. S. Read, J. Phillips, T. M. Frood, W. H. Thompson. Temporary Captains granted rank of Major: A. T. Edwards, A. C. S. Courts, W. H. Welsh, J. A. Doull, J. S. Stewart, A. C. Bryson. Temporary Captains retaining rank of Captain: G. S. Banks, J. V. Grant, J. W. N. Roberts, V. T. P. Webster, H. M. Brown, J. F. Smith, A. S. Richmond, P. A. B. Clark, S. F. Cheesman, J. H. Glover, J. M. Johnstone, W. G. Fee, R. W. T. Clampett, L. W. Batten, H. F. Brice-Smith, F. P. Hearder, G. Robinson, A. C. Profeit, T. L. Butler, M. W. Shutte, J. B. Lester, A. G. Payne, J. F. Sheppard, W. H. W. C. Carden, D. A. Farquharson. Temporary Lieutenants retaining the rank of Lieutenant: W. P. McCowan, W. A. S. Magrath, W. E. Martin, R. R. MacGregor, H. E. Thompson.

SPECIAL RESERVE OF OFFICERS.

The undermentioned Captains to be acting Majors whilst specially employed: M. Stewart, R. D. Cameron.

TERRITORIAL FORCE.

Lieut.-Col. Sir Wilmot P. Herringham is retired on attaining the age limit, and is granted the honorary rank of Major-General.

Capt. (acting Lieut.-Col.) G. R. Rickett, relinquishes the acting rank of Lieutenant-Colonel on ceasing to be specially employed.

Capts. (acting Majors) W. Scott, A. E. Mackenzie, and L. M. V. Mitchell relinquish the acting rank of Major on ceasing to be specially employed.

1st Eastern General Hospital: Capts. (acting Majors) G. S. Haynes and J. C. W. Graham relinquish the acting rank of Major on ceasing to be specially employed.

3rd Northern General Hospital: Major H. R. Dean is restored to the establishment.

TERRITORIAL FORCE RESERVE.

Capt. Sir James P. Stewart, from 4th London General Hospital, to be Colonel.

Capt. M. W. K. Bird relinquishes his commission on account of ill-health contracted on active service, and retains the rank of Captain.

ROYAL AIR FORCE.

Medical Branch.—Major A. Fairley (Surgeon Lieut.-Comdr., R.N.) relinquishes his commission on ceasing to be employed.

The undermentioned are transferred to unemployed list: Lieut.-Col. T. Philp; Capts. J. Freeman, C. C. O'Malley, (Hon. Major) D. Wilson, A. Sutcliffe, J. L. Whatley, H. M. Holt; Lieut. A. J. Swanton.

DEATHS IN THE SERVICES.

Captain George Thomas Whyte, F.R.C.S.Irel., D.P.H., R.A.M.C., who died at the Military Hospital, Spike Island, Queenstown, on June 9th, qualified in 1892 and took the F.R.C.S.Irel. in 1901. He served as civil medical officer to the Field Force during the South African War, and after obtaining a public health diploma returned to his post on the West African Medical Staff in Northern Nigeria. He had served 18 months in France during the war that is past, and died after a brief illness of four days. He leaves a widow and a little girl, aged 2 years.

Correspondence.

"Audi alteram partem."

THE PENSIONS PROBLEM.

To the Editor of THE LANCET.

SIR,—In connexion with the assessment of the pensions to be allotted to partially disabled officers and men, the power of prognosis of the medical profession is in many cases being submitted to a test that it cannot sustain. It is possible to estimate with some measure of accuracy the degree of future disability of a man who after an injury has had a limb or portion of a limb amputated. For these and some other similar cases a partial pension can be more or less fairly assessed. It is quite impossible to forecast with any approach to certainty the future average employability and proportionate earning capacity of a man who has sustained a gunshot wound of a viscus or has suffered from tuberculous or malarial infection. For these and very many similar cases no fair individual assessment can be made. Such cases could be put in groups according to their history and present condition, and a rough calculation made as to the average incidence of future disability amongst all the members in each group; just in the manner in which impaired lives seeking life insurance are dealt with. Probably something of this sort is being done now in allotting partial pensions. But what will be the result? Those with partial pensions who do not subsequently break down will be heard of no more, but the minority who, according to the law of averages, will break down badly will find their small pensions altogether inadequate, their hardships will quite rightly come under public notice, and the profession will be blamed for not having made for them adequate provision.

It would be well, therefore, for the profession at once to make clear to the public that it is quite impossible for science to provide the data on which a fair pension can be assessed in the case of large numbers of partially disabled men. Since, however, the number of such men—some not yet demobilised, others demobilised but still on temporary pensions—is very great, some provision must be made to meet their special risk of disability. For a considerable number of cases the most suitable way of meeting the risk would be the issue of a sickness insurance policy guaranteeing in the event of a breakdown in the future the periodical payment by the Government of a sum to meet the then ascertained degree of disability so far as it is not met by any other national insurance. In some cases such a policy would take the place of a partial pension, in others it would be additional to it. The task of dealing with many cases, which now present an insoluble problem, would at once become simple. It would only be necessary at the outset to earmark certain cases as having been rendered by injury or disease resulting from war service specially liable to relapses of disability, and later on to determine the fact of disability should it occur. The Ministry of Pensions must naturally look to the medical profession for advice as to fair and proper ways of dealing with all the various types of cases amongst those whose health has suffered from war service. Those medical men who are in a position to offer such advice should lose no time in pointing out that there is a large proportion of cases whose special claim upon the nation cannot be met by the old-fashioned method of a pension assessed according to the demonstrable degree of disability, but can be quite satisfactorily dealt with by a well-considered scheme of sickness insurance. Such a scheme could be easily devised and at once put in force. Those who ought to come under it are, as things stand at present, either not having their claims met or are being dealt with in a manner which will ultimately prove unfair to them or to the State.

I am, Sir, yours faithfully,

August 4th, 1919. LAURISTON E. SHAW.

INCIPIENT MENTAL DISEASES.

To the Editor of THE LANCET.

SIR,—In your issue of July 26th is published a letter by Dr. L. A. Weatherly on the treatment of cases of incipient mental disease, and while fully agreeing with most of his statements I do not think too strong a protest should be made against the proposed limitation of sojourn for such cases to six months. I quite agree with Dr. Weatherly that under such a regulation a certain number of patients may be found nearly well at the time they have to leave the institution; but I would rather this happen than have in any way retarded the facilities for early treatment that are apparently rapidly materialising.

In dealing with many thousands of cases of acute mental disorder in the early stages during the war in a military hospital I found that three months was an average period of residence. Out of 1000 cases in hospital at the end of a two years' period of admissions only 200 were found to have been resident six months or over, and 70 per cent. of these were looked upon as unlikely to make an early recovery. At the time I refer to it was the custom to keep such cases for nine months prior to certification, but from my previous experience I consider that any retention of chronic cases in a hospital intended for treatment of early cases is to be condemned in the strongest possible terms.

An atmosphere of cure is what is wanted above all things in such an institution, and for this reason I would support the limitation to six months, but would suggest that the words "provided that the patient is not making obvious improvement" be added, as a means of overcoming the difficulty referred to.—I am, Sir, yours faithfully,

RICHARD EAGER, M.D.

Devon Mental Hospital, Exminster, July 30th, 1919.

THE COÖRDINATION OF CLINICAL RESEARCH AND PSYCHOLOGICAL MEDICINE.

To the Editor of THE LANCET.

SIR,—In THE LANCET of August 2nd there appeared an article by Dr. Bedford Pierce on "Psychiatry a Hundred Years Ago," also a letter from Dr. E. Goodall setting out what Cardiff is about to do in the present. I should like to draw attention to the fact that Birmingham already has a special hospital for the treatment of nervous diseases, the largest department of which is a "psychoneurosis clinic." The hospital was founded in 1913, but before beds could be provided in a suitable, quiet locality the war broke out. The governors, therefore, deemed it wise to postpone the opening of the in-patient department for mental cases until after the war. Immediately upon the cessation of hostilities they acquired a very suitable property with large grounds attached, and this will be ready for the reception of patients by the end of next month.

I wish to emphasise, in this connexion, two or three points which seem to me to have been passed over by the writers referred to above. The first point—mentioned in your leading article but not sufficiently stressed—is the necessity of separating early borderline and psychogenic from certifiable cases. If the public even suspect that they or their friends are being invited to attend an institution in any way associated with an asylum the early cases, in which treatment is most likely to be effectual, will not present themselves. For this reason it seems to me essential that the special clinics now springing up should be kept free from any taint of the asylum. The term "hospital for nervous diseases" or disorders seems acceptable to the general public, and I suggest that its adoption would avoid the danger under discussion. There is another advantage to be gained by working the new clinics from a special hospital for "nervous diseases"—viz., the well-recognised fact that even in cases in which the primary causal factor is indisputable of organic origin, it is nevertheless the superadded functional or psychogenic symptoms which cause most trouble, though they are also the most amenable to suitable treatment. Such cases willingly attend a hospital for nervous diseases where both elements of their trouble can be tackled, but they would merely be offended were they asked to attend a psychiatric clinic. Again, although borderline and psychogenic cases should be separated from advanced and hopeless cases of insanity, it will, from the research point of view, be a great advance if all diseases with a pronounced psychogenic element can be grouped and observed together with ordinary neurological cases instead of being dealt with by the more or less logic-tight-compartment methods hitherto in vogue.

My last point concerns the desirability, in large towns at any rate, of separating the out- from the in-patient department. The former must be in a central situation, which implies a small and noisy site, whereas the latter ought to

be in a quiet locality and have large grounds and workshops attached, so that occupation and recreation may be available for the patients. During the year 1918 the out-patient attendances at the Birmingham Nerve Hospital totalled 17,246, while the beds provided at present are for 30 patients only. It would be unwise to attempt to divert so many out-patients from a conveniently situated central institution, and impracticable to provide adequate accommodation for this special type of in-patient upon a centrally situated site. The governors, therefore, have located their new in-patient department for functional and borderline cases at some distance from the original institution, although this involves an increase in the expenses of management.

My plea, then, is that the basis of the new clinics be broadened and that at the same time everything reasonable be done to secure the confidence of those whom we are seeking to benefit.—I am, Sir, yours faithfully,

ALFRED CARVER.

Birmingham and Midland Hospital for Diseases of the Nervous System, Birmingham, August 4th, 1919.

THE ORIGIN OF LIFE: THE WORK OF THE LATE CHARLTON BASTIAN.

To the Editor of THE LANCET.

MONSIEUR,—Je n'aurais eu, pour le moment, que peu de chose à ajouter à ma lettre parue dans vos colonnes le 28 Juin dernier, si l'intervention de M. John Butler Burke (THE LANCET, 26 Juillet) n'était venue introduire de nouvelles hypothèses dans l'interprétation des expériences du Dr. Bastian et autres essais du même genre. Je dois pleinement reconnaître le très grand intérêt des *Radiobes* de M. Burke, dont les propriétés biotiques sont saisissantes; mais Raphaël Dubois (avant M. Burke) et Martin Kuckuck (après lui), ont obtenu des résultats exactement semblables en utilisant des sels *non* radioactifs de baryum, strontium, &c. Comme les radiobes de M. Burke, les *microbiwides* de Dubois et les *baryumcytoden* de Kuckuck grossissent, se meuvent, se reproduisent par bipartition, semblent parfois se conjuguer à la manière de certaines algues monocellulaires: ce qui ne les empêche nullement de passer, en vieillissant, à l'état de cristaux polyédriques inertes. Il semble difficile de voir dans ces corpuscules autre chose que de très petits cristaux imparfaits dont le stade précristallin se trouve considérablement prolongé par l'ambience colloïdale; d'ailleurs, tous les cristaux en voie de formation, surtout dans des milieux très visqueux, se comportent temporairement, au point de vue structural et dynamique, comme des êtres vivants. A l'appui de ce que j'avance, je mentionnerai les *Protobies* de A. L. Herrera (cristaux imparfaits en milieux siliciques) et nos propres expériences sur la formation des cristaux.[1] La radioactivité me semble, en toute sincérité absolument étrangère à de telles questions. Quant au rôle de la diffusion et de la pression osmotique dans l'apparition des bactéries minérales de Bastian et Mary, il doit être inexistant. Sans doute, mon éminent ami Stéphane Leduc a produit, par osmose, et aussi par diffusion de cristalloïdes dans les gels colloïdaux, une profusion de formes et de structures artificielles de nature à nous renseigner sur l'intervention des forces capillaires dans la détermination des caractères morphologiques et physiologiques généraux des organismes. Mais les croissances osmotiques, que nous avons aussi étudiées depuis 1908, sont des vésicules, et les figures de diffusion dans les gels n'ont pas d'existence en-dehors de leur substratum colloïdal. Les corpuscules synthétiques de Bastian sont formés par les colloïdes eux-mêmes, et ne sont pas vésiculaires. Pour expliquer le mécanisme physique de leur développement, c'est exclusivement à la physico-chimie colloïdale qu'il faut faire appel, et tout l'intérêt du problème tient précisément à ce fait qu'il n'y a qu'*une* physico-chimie colloïdale, embrassant dans des lois communes l'organique et le minéral.—Je suis, Monsieur, très sincèrement vôtre,

ALBERT MARY.

Institut de Biophysique, Paris, 30 Juillet, 1919.

[1] Voir *L'Actualité Scientifique*, Paris, Mai, 1919.

To the Editor of THE LANCET.

SIR,—Mr. S. G. Paine, writing some time ago in your columns on the "Origin of Life," in particular connexion with the work of Charlton Bastian, mentioned that the sand of the Egyptian desert, which is subjected to a considerable heat, contains living protozoa. I do not know what temperature these organisms can withstand, but it should be remembered that under those conditions the heat will be dry. The following facts, however, show that the limits of resistance of certain organisms, even to moist heat, are greater than was suspected. M. Paul Portier, professeur à l'Institut Océanographique, in his recent work entitled "Les Symbiotes" (Masson et Cie, 1918), describes certain symbiotic micro-organisms, isolated from both vertebrates and insects, which are extraordinarily resistant to physical and chemical agents. When freshly isolated they are killed by a temperature of 100° C., but after a few subcultivations the temperature must be raised to 115° C., moist heat. In a dry atmosphere they can resist a temperature of 140° C., and are only just killed by a temperature of 150° C., maintained for half an hour. Further, these organisms may be boiled in absolute alcohol, chloroform, or acetone, and yet remain capable of cultivation. In one set of experiments, indeed, they withstood heating in acetone in sealed tubes at a temperature of 100° C. to 120° C.

In connexion with this subject it may be mentioned that certain enzymes, as, for instance, ptyalin, which begin to decompose at a temperature of 60° C. and are completely destroyed by temperatures of less than 100° C., can, when dialysed free from all traces of electrolytes, be boiled without losing all activity, which returns on the readdition of a little salt. In view of such facts, experiments similar to Dr. Bastian's must be carried out with the greatest possible precautions as to technique and sterilisation. It is true that the interesting experiments of Dr. Mary were carried out at a temperature which should kill any organisms at present known. Dr. Mary, however, admits that the bodies found in his solutions do not contain any protein and are incapable of cultivation, even on the simple solutions which are supposed to generate them—that is to say, they are not living matter in any ordinarily accepted use of that term.

Since writing the above, I have seen Commander Bastian's letter of July 26th. I gather the objections he raises to my experiments[1] are two. (*a*) That the "yellow solution" contained ammonium phosphate and phosphoric acid in addition to the proper ingredients, and (*b*) that the tubes were kept for too long a period, during which the "organisms," which were supposed to have developed, died. In the first place, I must thank Commander Bastian for pointing out my error. I cannot excuse such carelessless, my only explanation is that when writing up the account of the experiments during the war and several years after the solutions were made up, I foolishly referred to Dr. Bastian's "Origin of Life," instead of to my own notes, in order to ascertain the composition of the solutions, which being quite arbitrary, I had not unnaturally forgotten. Though there is no doubt as to Dr. Bastian's meaning when carefully read, anyone who will take the trouble to look up the reference (p. 30) will see that the words, "the proportion of the other ingredients remaining always the same," might be misleading in the hurry of the moment. I have now looked up my original notes, and I beg leave to correct the error by making the following quotation from my note-book:—

"On Sunday, August 10th (1913) ..... test-tubes of hard white German glass 5 in. × ½ in. ..... were charged half full with Dr. Bastian's 'yellow solution,' consisting of 8 drops of liquor ferri pernitratis and 3 drops of dilute sodium silicate (from A and H's sample reserved for Dr. Bastian) to each oz. of distilled water, ... these proportions gave the port-wine colour recommended by Dr. Bastian with a minimum amount of sediment."

On the next page the correct formulæ for both solutions are written in a tabular form above the two series of tubes. I trust that Commander Bastian will accept this evidence. With regard to his second criticism, I think Commander Bastian makes a misrepresentation. He implies that the tubes of the "white solution" were kept for 38 months before being opened, whereas the truth is that the tubes of both series were opened at varying periods *from* 1½ months *to* 38 months (at intervals of about 3 months). The period of 38 months was only the maximum duration of the experiment. I believe the longest that Dr. Bastian kept his tubes was two years. When planning the experiments I therefore considered that if I kept some of the tubes for three years I could not be accused of impatience. I must apologise for taking up so much of your valuable space, and beg to remain,

Yours faithfully,

H. ONSLOW.

The Biochemical Laboratory, Cambridge, August 2nd, 1919.

[1] Proc. Roy. Soc., B, vol. xc., p. 266.

A CRITICISM OF THE MEMORANDUM ON MALARIA.

To the Editor of THE LANCET.

SIR,—I must protest against the pernicious and dangerous advice given by Dr. Gordon Ward in his criticism of the Memorandum on Malaria in your issue of July 19th. He says:—

"The most important principle in the treatment of malaria in pensioners is the improvement of the natural resistance of the body with the aid of as little quinine as possible."

It is just such treatment that is filling the wards in our hospitals with pensioners and demobilised men. They all come in with the same story. Since they left the Army they have had recurrent attacks of fever, been treated by civil practitioners with totally inadequate doses of quinine, which have had no effect on their malaria, and finally have to come into hospital. There they are put on 10-gr. doses of quinine sulphate in solution, three times a day, and they very rarely have more that one rigor after the treatment has begun. It is a great relief to the men to find they are rid of their fever in 48 hours, after recurrent attacks; in one case for five weeks on minimum doses of quinine. It may now be regarded as established beyond a doubt that the optimum dose of quinine during the attack is that stated in the Memorandum—viz., 10 gr. of sulphate or hydrochloride in solution three times a day; whilst the experience at concentration centres has proved that 10 gr. a day is a valuable anti-relapse precaution. If this be carried out regularly over a prolonged period, say, three months, and relapses prevented, the natural resistance of the body will assert itself and justify Osler's dictum, that the proper treatment of malaria is "quinine and time, both in divided doses."

The danger we have to fight against is the fear of the civil practitioner to give adequate doses for a sufficiently long period, and we are not helped by such advice as Dr. Ward gives. Dr. Ward's picture of the man with chronic tachycardia and effort syndrome is in most cases the result of inadequate doses of quinine for a short period, allowing frequent relapses and general deterioration of health. If Dr. Ward will re-read the Memorandum carefully he will find that the intramuscular method of administration is recommended only when vomiting is so persistent that quinine cannot be given by the mouth, or in pernicious attacks, when no time must be lost. It is not advocated in simple attacks without complications.

Twenty months in the malaria section of a military hospital in England have only confirmed what 20 years' experience in the tropics had already taught me, that the intramuscular giving of quinine is a most valuable method in urgent cases, and that by using quinine bi-hydrochloride, being careful about sterilising the solution, and all the apparatus, and making the injection actually into the muscle and not subcutaneously, the risk of causing abscess is small, whilst a very elementary knowledge of anatomy will enable one not to inject in the close proximity of an important nerve trunk. In about 2000 cases I have had through my hands in this country I have seen only one partially paralysed arm as the result of an injection, and in that case the needle had been inserted directly over the musculo-spiral nerve. Pernicious attacks in this country fortunately are rare, but in such cases the intramuscular route is pre-eminently the safest for the civil practitioner to follow.

I am, Sir, yours faithfully,
T. H. JAMIESON, M.D., M.R.C.P. Edin.,
London, July 31st, 1919. D.T.M.H., D.P.H.

DUPLICATION IN HUMAN SPERMATOZOA.

To the Editor of THE LANCET.

SIR,—If Mr. S. R. Tattersall, who communicated to THE LANCET of August 2nd on the above subject, would look up Broman's "Normale und Abnorme Entwicklung des Menschen," p. 18 et seq., he will find the conditions he has described as well as excellent photographs of the specimens. He will further find an interesting discussion of the whole question of abnormal spermatozoa, by one who has done much work on the subject, but whose magnificent book seems to be little known.

I am, Sir, yours faithfully,
EDWARD FAWCETT,
August 2nd, 1919. Professor of Anatomy, University of Bristol.

THE RESULTS OF COMPLETE COLECTOMY.

To the Editor of THE LANCET.

SIR,—Major James Taylor is quite correct in stating, in your issue of August 2nd, that there is a very general belief that many patients do not recover from the operation (of complete colectomy), and that those who do are no longer capable of leading an active life. This general impression is not likely to be changed in any way by a perusal of Major Taylor's paper. His small series of cases is of undoubted interest, but it is to be regretted that he does not give any information of the after-progress of Cases 1 and 2 and a full description of the "diseased condition of the rectum" held responsible for the imperfect recovery of Case 3. The operation of complete colectomy for intestinal stasis will remain under a cloud so long as those surgeons who perform it are content to support their views by the publication of their cases in this imperfect manner.

I am, Sir, yours faithfully,
Leeds, August 2nd, 1919. J. F. DOBSON.

SHELL SHOCK IN FISHES.

To the Editor of THE LANCET.

SIR,—Dr. Alfred Carver narrates in your columns last week certain experiments on fishes; these were made only on perches. Dr. Carver will be interested to hear that Dr. A. G. Mayer[1] found that when a halt stick of dynamite was exploded within 3 ft. of a small shark (Carver's zone A with a vengeance) no apparent injury was produced; the same thing applied in a lesser degree to such teleosts as lack swim-bladders. When swim-bladder fishes were killed by the explosion their swim-bladder burst, the tissues were crushed, and the vertebral column was often broken. Mayer attributes the injurious effects of explosives in fishes, when present, to mechanical laceration of tissues, and especially the crushing inward of air-filled cavities. A full abstract of Mayer's paper appears over my signature in the *Review of Neurology and Psychiatry*, 1917, xv., p. 335.

I am, Sir, yours faithfully,
London, N.W., August 1st, 1919. LEONARD J. KIDD.

HOME HOSPITAL ESTABLISHMENTS AND THE WAR MEDALS.

To the Editor of THE LANCET.

SIR,—I wish to call attention to the gross unfairness of laying down a geographical qualification for the 1914–15 Star, General Service, and Victory Medals, at all events as regards the medical establishments. Elderly medical men in the R.A.M.C., whether Reserve, Special Reserve, or Territorial, were called up at the outbreak of the war in August, 1914. Often this entailed the abandonment of our private practices, our means of livelihood, and serious financial loss. We have been in charge of, or performing important services in, large general hospitals and their auxiliaries, or in the military hospitals and training camps; and we have been kept in this country because we could not be replaced. We have been overwhelmed with work which has been absolutely essential, yet we have not been considered to be entitled to the medals issued to commemorate this, the greatest of all wars, because, forsooth, we have not crossed the Channel!

This decision is contrary to precedent. It has always previously been recognised that the medical establishment had a special claim to medals issued to commemorate a campaign in view of their special work of dealing with the wounded. The hospitals in this country have equally with those in France been associated with the fighting forces. They have taken wounded practically direct from the battle-fields, Americans, Belgians, Chinese, French, Serbians, besides the British and Dominion troops; yet, having performed these services to our Allies, we alone of all the Allied forces are not to have the Allies Medal! It is sought to justify this discrimination by excluding this country from the list of "war areas." But we who, by the exigencies of the service, were retained here, have been declared to be serving "on Active Service" and have drawn "Field Allowances." Hitherto the necessary corollary to such conditions has been the issue of the medal granted for the campaign.

What makes this discrimination more remarkable is that it does not apply to Dominion troops. They receive not

[1] Proc. National Acad. Sciences of U.S.A., 1917, iii., p. 597.

only the war medals, but also the chevrons, without the necessity of crossing the Channel. Hence, in their case, it follows that they are given, not according to the precise locality in which the war service was rendered, but merely from the place of residence before the war. Surely a a "reductio ad absurdum." Another precedent for the issue of a war medal without actually entering a "war area" was the issue of the South African Medal, without clasps, to the Militia Garrisons in the Mediterranean.

It is suggested that hospital and medical services rendered in this country should be recognised by the issue of the General Service Medal, without the clasps, which will, no doubt, later be granted for service in particular battles or war areas; and that the Victory Medal should be given with date clasps. Any other distribution is most unfair to those who have formed the personnel of the hospitals and medical establishments in this country. The Royal Red Cross has been given to a small percentage of the nursing staffs, and no one has ventured to deny the justice of the award; but hospitals are not run by nurses alone. With the exception of a few commandants, the V.A.D. workers have been ignored

Practically all of us are now returning to civil life, with absolutely nothing to indicate that our services have been appreciated, or that we have done our duty in accordance with the orders of the higher authorities; but I am confident that I speak for my medical colleagues when I say that we desire no decorations which are not shared by the whole male and female personnel who have so nobly sacrificed themselves to tend and succour the sick and wounded in the hospitals of this country, services which have been absolutely indispensable to the victory of the Allies, and which are universally recognised as reflecting the utmost credit and honour upon all concerned.

I am, Sir, yours faithfully,

August 5th, 1919. IGNORED.

THE MARRIAGE OF ASSISTANT MEDICAL OFFICERS AT ASYLUMS.

To the Editor of THE LANCET

SIR,—I read with great interest in THE LANCET of July 19th the article setting forth the new conditions laid down for assistant medical officers in the London County asylums. In the issue for July 26th there is an advertisement for an assistant medical officer at a borough asylum, and it may interest you to know how the vacancy has arisen. In April, 1907, I became assistant medical officer at a borough asylum, and continued to hold that post till I joined up in July, 1917; but I still remained technically assistant medical officer, and my post was open for me when I left the Army. In February of this year I married, and shortly after I was asked by my committee to resign; this I refused to do, as I had not done anything wrong. They then gave me notice of dismissal on the ground that there was no accommodation for a married A.M.O. I replied to that by saying that I did not ask for extra accommodation, and that I was willing to go back and live as a single man as I did previously, my wife living elsewhere. Their reply was simply to dismiss me because I had married.

It is surely cruel and unjust to penalise marriage so very heavily, and to dismiss a man—after ten years' service—just because he has married. The committee expressed themselves as being quite satisfied with my services, and allege no reason for dismissing me but the fact that I have married. I have been turned out of my post, at 45 years of age, without pension or compensation of any kind, and with practically no chance, by reason of age, of getting another asylum post, the work to which I devoted all my professional life. I am still serving in the Army, so the action of the committee is at least premature. I think such action by a committee ought to be made widely known, and I shall be glad to hear the views of others.

I am, Sir, yours faithfully,

July 30th, 1919. DISMISSED.

THE Committee of the Territorial Force Medical Officers' Association are making arrangements for a dinner in October next for Territorial medical officers. Any medical officer who wishes to be present should send his name to Lieutenant-Colonel D. L. Hamilton, R.A.M.C., T.F.R., 37, Russell-square, London, W.C., who is acting as honorary secretary for the dinner.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

PENSIONS REORGANISATION.

Changes in Medical Arrangements.—Increases in Personnel.

THE House of Commons went into Committee of Supply on Thursday, July 31st, on the Supplementary Vote of £45,855,000 for the salaries and expenses of the Ministry of Pensions.

Sir L. WORTHINGTON-EVANS (Minister of Pensions) stated that the decisions of the Government upon the recommendations made in the interim report of the Select Committee on Pensions would call for an extra expenditure for the remainder of this year of about £11,000,000, so that the estimates should be treated as £86,000,000, and not as just under £73,000,000 as presented. For a full year, as long as the number of pensioners remained at or near the maximum, the rate would be about £96,000,000. Dealing with the new scheme of decentralisation, the right honourable gentleman said that all medical boards and arrangements for medical treatment would be dealt with by the regional medical officer. Proceeding to speak of the medical services of the Ministry, the Minister said:—

"I have been fortunate in securing as Chief Medical Officer Colonel Webb. During the war he held an important position in the medical service of the War Office, and he brings a very special knowledge of the requirements of the serving man who is now a pensioner to the service of the pensioners. The work of this division is probably the most important of any of the divisions of the Ministry. It deals with that primary necessity of the disabled man—namely, the provision of medical treatment both in hospitals and clinics and convalescent centres. When the bulk of the men were in the Army, the Army did the work, but demobilisation has transferred the necessity for providing hospitals and clinics from the War Office to the Ministry of Pensions. We have already taken over from the War Office two hospitals, and arrangements are practically complete for the transfer of others. The Red Cross are assisting the Pensions Ministry as they assisted the War Office.

Nursing Service.

"As we take over hospitals we are bound to provide a nursing service, and I am glad to say that Queen Alexandra has graciously consented to be president of the Pensions Nursing Service. I have been fortunate to secure as matron-in-chief Miss M. E. Davies, R.R.C., who will be assisted by an advisory committee. I am also hoping to have ready very shortly certain convalescent centres at Blackpool, Epsom, and elsewhere, in which men who, while suffering from disabilities which require more or less prolonged out-patient treatment, will be able to employ their time to their own advantage by receiving preliminary training to fit them for their after life. I have been impressed by the large number of out-patients attending hospitals for perhaps half an hour a day, upon whose hands time hangs heavily. I believe that if such men as these are admitted to convalescent centres they will, while receiving treatment, be capable of much useful training during their convalescent stage, and more rapidly benefit by the industrial training thereafter given them under the Ministry of Labour. Moreover, experience shows that many men, attracted no doubt by the high wages and the demand for labour during the latter stages of the war, who went into industrial life, are likely to break down and require more or less prolonged convalescent treatment. For these, also, the convalescent centres are likely to prove of great use.

Medical Boards.

"Until recently the boarding of the men applying for pensions and the re-boarding of men on renewal of pensions was performed by the Ministry of National Service, but on April 1st last the central and regional staff of the Ministry of National Service was transferred to the Ministry of Pensions, and we became directly responsible for the boarding of all men. On August 4th we are taking over from the War Office the Re-survey Boarding of Officers. To give the Committee some idea of the extent of the increase of the work of medical boards, I may inform them that 229,697 men were examined by medical boards in the six months ending June last. There has been a steady and rapid increase in the number of men boarded owing to demobilisation, and in June last 45,000 men were boarded.

Medical Appeal Boards.

"The Committee may be aware that under the system hitherto prevailing the medical officers at the headquarters of the Ministry reviewed the decisions of these boards and a medical officer was authorised to alter the amount of a man's assessment by a board without himself re-examining the man. Many complaints of this system have been brought to my

notice, and the Select Committee has recently called special attention to this system, and has recommended that any case of doubt should be sent for re-hearing by the same or by a second board, who in every case should examine the man in person. I entirely agree with this recommendation. Indeed, I informed the Select Committee when I gave evidence before it, that I intended to alter the system as soon as the decentralised regions were set up. While it was probably impossible to arrange for Appeal Boards before the Ministry of Pensions had its own medical personnel available to sit on boards and specialists, both surgical and medical, at its hospitals and clinics to constitute the boards, it will be possible to set up the Appeal Boards as soon as the medical personnel in the regions has been completed. Thereafter, a definite procedure will be laid down, which will be followed in all cases—namely, that if the Medical Assessor, on scrutinising the report of the board, is not satisfied that substantial justice has been done either to the pensioner or to the taxpayer, he is not to alter the assessment, but he is to refer the case either to the same board or to an Appeal Medical Board for a re-examination of the man—and similarly, if the pensioner himself is not satisfied that his degree of disability has been correctly assessed—that is to say, if he is not satisfied with the amount of his pension, he will have the right to appeal himself to a Medical Appeal Board, whose decision in the case has to be treated as final, subject to this proviso, which is in the man's interest, that if he gets seriously worse during the period for which the assessment has been made, he may go to a medical referee who may give him temporarily a higher allowance pending the reconsideration of his case by the board. This arrangement of Appeal Boards, while, I believe, absolutely necessary in the interests of justice and to give the pensioner a reasonable assurance that his case is properly considered, will entail a large increase in the medical personnel, which can only be supplied if not only the permanent medical staff of the region is available for boards, but also the specialists attached to the hospitals and clinics, and probably in some cases the medical referees.

Artificial Limbs.

"As regards the provision of artificial limbs, soon after I became Minister I wanted to be satisfied that the provision of artificial limbs for both officers and men was sufficient, and that the best limbs were being supplied. I accordingly set up a very strong Committee, upon which several Members of the House kindly served, and they have recently reported. On the whole their report shows that the position is satisfactory. They have made several recommendations which are in the course of being carried out. Perhaps the most important is that an expert Committee should be set up to review all the various forms of artificial limbs at present made with a view to standardisation, by selecting the best from each limb. It is proposed that fitting centres shall be established in connexion with orthopædic hospitals spread throughout the country, and that in addition repair depôts shall be opened in populous centres, so that minor repairs can be made in a short time. I have also referred to the Committee the extent to which fibre pylons should be supplied and used by men with artificial limbs. I fancy that fibre pylons will take their place alongside artificial limbs much as a slipper does to a boot, and that a man with an artificial limb coming home from his daily occupation will be glad to change it for a light fibre pylon. However, that is primarily a surgical question, and I have therefore referred it to the surgeons for advice.

Tuberculosis.

"I was also not satisfied that the provision made for the pensioner suffering from tuberculosis was sufficient, and in agreement with the Minister of Health we appointed a Joint Committee for the purpose of thoroughly investigating this question. The Joint Committee has now reported, and immediate consideration will be given to the report.

Independent Tribunals.

"The Government is prepared to accept the recommendation of the Select Committee that the appeal tribunals shall be set up under an authority independent of the Ministry of Pensions, and a Bill will be introduced as soon as possible to empower the Lord Chancellor to set up appeal tribunals and to make the necessary regulations in respect to the procedure. The tribunals will consist of one legal representative, either a barrister or solicitor, who will be chairman of the tribunal, and a disabled officer in officers' cases and a disabled man in men's cases with a duly qualified medical practitioner. Any refusal on the part of the Ministry to a claim for pension on the ground that the disability is not attributable to, or aggravated by, military service, or is due to serious negligence or misconduct of the claimant, will be subject to appeal by the claimant to this independent tribunal. Similarly, a widow or a motherless child whose claim to pension is rejected on the ground that the death of the officer or man was not due to military service will be subject to appeal. In this way there will be granted a statutory right to assert a claim to pension and a statutory court, independent entirely of the Ministry, will be the sole and final judge of whether the right exists in a particular case.

Appeals on Amount of Pension.

"It is suggested by the Select Committee that there should be a lay ex-service element on the tribunal, but as the assessment questions are mainly medical questions the medical element should have a majority, and they advise that this medical element should comprise senior surgeons and specialists in the diseases or injuries causing the disabilities under consideration. This recommendation appears to me to be entirely impracticable. During the last six months 920,439 awards have been made, or, if I deduct from this total awards to widows, children, and dependents, nearly 700,000 awards have been made either for the first time or on renewal to men. These awards are made for varying periods for from six to 12 months. The Select Committee recognises that an appeal would be of no use unless the medical men upon the appeal tribunal were more authoritative than the medical men who made the original assessment. If even 1 in 10 men appealed we should have something like 70,000 appeals in six months, and the delays would be so great that the appeals could not be heard before the pension had expired. Moreover, it would be impossible to get the authoritative consultants and specialists in sufficient numbers to form the appeal tribunals. I do not believe that a reform is possible upon these lines. I do, however, agree that it is quite wrong for any medical assessor who has not seen a man to alter an assessment made by a board who has seen the man, and as soon as the regional organisation is complete Medical Appeal Boards will be set up to which either the man or the department can appeal in the event of the assessment being challenged. I ask the Committee to believe me that this is the practical way of curing the evil which the Select Committee has pointed out. Any outside tribunal dealing with these assessments would cause so much delay as to actually deprive the man of the benefits which the Select Committee desires him to obtain."

Tuberculosis Committee's Report.

Sir MONTAGUE BARLOW (chairman of the Select Committee on Pensions and deputy chairman of the Committee on Tuberculosis), alluding to the report of the latter committee, which the Government are still considering, said that, roughly speaking, the Committee found that there were some 30,000 or 40,000 tuberculous discharged soldiers. The first point the Committee desired to make was that the tuberculous soldier was only one part of the general problem of tuberculosis throughout the country. In the early stages, at any rate, the tuberculous soldier must fit into the ordinary machinery of tuberculous treatment throughout the country. In the next place, the Committee had found that the accommodation with regard to sanatoriums and hospitals was unsatisfactory and insufficient. The requirement of additional sanatoriums had got to be dealt with as it was very urgent.

Captain LOSEBY said the Select Committee had made definite recommendations in regard to the constitution of the medical boards and the constitution of the appeal board. He urged the Minister to throw these recommendations overboard. He could find a simpler method of putting up medical boards which would enable him to give the right of appeal to which every man who had been tried for his life had a right. Perhaps he would consider the proposition that a medical board might be equally competent as now if there was only one medical man upon it and two laymen. He would thus get over his difficulty of medical personnel.

Mr. LEONARD LYLE said many of the medical boards looked upon their job in the same way as a big insurance company doctor looked at his job. The point of view of the insurance doctor was to see how little he could give the men. It was his job to try to make a total disablement into a two-thirds disablement, and a two-thirds disablement into a half disablement. Medical men were just as humane as anyone else, but they had got it into their heads that if there was a doubt the benefit of the doubt must not go to the man, but to the other side. New ideas should be put into the heads of these medical boards. Some of the questions were inquisitorial to say the least. Men had been asked by a medical board what wages they had been earning.

Sir L. WORTHINGTON-EVANS: The honourable Member knows that that question has been withdrawn. The men were always told that they need not answer it unless they liked, but now no one has any right to ask the question.

Mr. LYLE said he was glad to hear it, and it would do good that such a statement had been made. Sometimes doctors did ask this question, although they were not entitled to do so.

Dr. MURRAY: Were they not originally ordered to ask the question?

Mr. LYLE said if it was not to be asked any more he was pleased to hear it.

Dr. MURRAY said that one of the most cruel duties that could be placed on medical boards was that they should be asked to say whether a certain disease was caused by, or had been aggravated by, service in the war. It was not a question that should be put to a medical board. He quite admitted that the doctors might be wrong, and in such a case the benefit should be given to the man. The position at present was illogical and unscientific, and might without difficulty be accounted an injustice. Medical reports were certainly not perfect, but it must be remembered after all that it was a new work to medical men. The doctors on these boards did not act on their own unaided intelligence, but got their orders from above.

The vote was agreed to. ——

HOUSE OF COMMONS.

WEDNESDAY JULY 30TH.

Medical Treatment for Officers from India.

Colonel YATE asked the Secretary for India whether, considering the importance of the generous arrangement made by him for the treatment of civil and military officers from India suffering from tropical diseases at the hospital of the London School of Tropical Medicine, he would take steps to have his recent announcement on the subject published in India for the information of all concerned.—Mr. MONTAGU replied: Yes, sir.

The Use of Opium, Morphine, and Cocaine.

Sir JAMES AGG-GARDNER asked the Home Secretary whether Regulations 40 and 40B under the Defence of the Realm Act, restricting the use of opium, morphine, and cocaine, would cease to be operative before the projected pharmacy legislation to give effect to the provisions of the International Opium Convention, 1912, had been enacted.—Mr. SHORTT replied: I hope Parliament will agree to keeping Regulation 40B in force long enough to allow legislation to be passed to give effect to the International Convention.

War Gratuities for Naval Nurses.

Major Sir BERTRAM FALLE asked the Secretary to the Admiralty if he would state if any increase of pay, gratuity, or war gratuity had been, or was to be, given to the naval nursing sisters for their work.—Dr. MACNAMARA replied: I presume that my honourable and gallant friend's question refers to nursing sisters and reserve nursing sisters of Queen Alexandra's Royal Naval Nursing Service, and not to V.A.D. nursing members or British Red Cross Association nurses employed in naval hospitals. The rates of pay of reserve nursing sisters were revised in September, 1918. The rates of pay for nursing sisters (active service) is at present under consideration. We are at present in correspondence with the War Office on this point, and that department hopes to be able to give its observations shortly. No war bonus is payable to nurses, as they are in receipt of free victualling and the larger part of their uniform is provided at public expense. It has been decided to extend the War Office scheme of war gratuities for nurses to the naval nursing staff, and it is hoped to publish full details in the press at an early date.

THURSDAY, JULY 31ST.

Royal Army Medical Corps Appointments.

Mr. LEONARD LYLE asked the Secretary for War if he would say on whose recommendation senior appointments were made in the Royal Army Medical Corps, and whether an advisory committee was appointed for this purpose.—Captain GUEST (Joint Patronage Secretary to the Treasury) replied: The promotion of officers to the senior ranks of the Army Medical Service is made by the Army Council on the recommendation of a Selection Board composed of Major-Generals of the Army Medical Service.

MONDAY, AUGUST 4TH.

Royal Army Medical Corps in Egypt.

Viscount WOLMER asked the Secretary for War if he would say how many units of the Royal Army Medical Corps were being retained in Egypt; and whether it was proposed to send any of these home at an early date.—Mr. CHURCHILL replied: There are 51 units of the Royal Army Medical Corps in Egypt, including field ambulances, hospitals, sanitary sections, depôts, &c. As these units become surplus to requirements they are disbanded in Egypt, and the personnel, if available for demobilisation, is sent to this country for dispersal. Those who are not eligible for demobilisation are utilised for reinforcements.

Ex-Service Men and Tuberculosis.

Lieutenant-Colonel RAW asked the Minister of Health whether he had considered the Report of the Special Committee on Tuberculous ex-Service Men, and when it would be made public, as the matter was one of great urgency.—Mr. PARKER replied: My right honourable friend has only received the Report of the Committee within the last few days. He will consider it at once and discuss the matter with the Minister of Pensions, who, jointly with himself, appointed the Committee.

TUESDAY, AUGUST 5TH.

Treatment of Uncertifiable Mental Cases.

Colonel WEDGWOOD asked the Minister of Health if he would state what steps he was taking with a view to providing in all areas convalescent homes for the benefit of early uncertifiable mental cases, so as to prevent their growing worse and becoming certifiable and a burden on the State; and, in order that such homes should not be regarded as half-way houses to asylums, would he ensure that intending patients should enter voluntarily and without compulsion in the same way as they would enter a hospital, and that the homes so provided should have no connexion with lunacy administration.—Major ASTOR (Parliamentary Secretary to the Ministry of Health) replied: The proposal in the first part of the question, with which I am in full sympathy, would require legislation for it to be effectively carried out. This matter, together with the important points referred to in the rest of the question, with which I am also in sympathy, are having very careful consideration between my right honourable friend the Minister of Health and my right honourable friend the Home Secretary, and it is hoped that suitable legislation for the purpose in view may shortly be introduced.

State Medical Service.

Mr. LEONARD LYLE asked the Minister of Health whether any representations had been made to him with regard to the establishment of a State Medical Service; and whether, in that case, he would indicate their nature and state whether the Ministry had considered them, and with what result.—Major ASTOR: Several different proposals have reached my right honourable friend from time to time as to new schemes for public medical services. I am sending the honourable Member a copy of the reply which my right honourable friend gave on May 28th to a question on this subject from the honourable and gallant Member for Leeds, from which he will see that the development of local medical services of various kinds is certainly contemplated by the Ministry of Health; but the opinions of the consultative councils will be sought before any substantial steps on these lines will be decided upon.

Cholera Outbreak in India.

Viscount WOLMER asked the Secretary for India whether he was aware that there had recently been a serious outbreak of cholera among the troops of the 6th Indian Brigade at Ali Masjid on the North-West Frontier, and that in the brigade about 400 cases and over 100 deaths had occurred; that the medical personnel attached to the brigade was not up to the establishment strength and was quite inadequate to deal with the outbreak; that there was a breakdown in the medical arrangements; that insufficient anti-cholera vaccine was available; and that the supply of saline tabloids was inadequate; and whether he would cause an inquiry to be made into the matter.—Mr. MONTAGU: An outbreak of cholera in the Khyber Pass has been reported, but the number of cases in the 6th Indian Brigade was not stated. As regards the remainder of the noble Lord's question I have telegraphed for information.

Health of the Troops in India.

Replying to Colonel YATE, Mr. MONTAGU stated that he had received a telegraphic report from India to the effect that orders had been issued to all generals in command that medical officers were to ask for whatever they deemed necessary for the comfort of the sick and wounded in their charge and that their demands were to be met at once. Additional hospitals for 4000 British and 8000 Indian troops had been established in specially fitted barracks in proximity to the frontier, and electric lighting and fans where none already existed were being supplied to the former. Convalescent depôts for officers and soldiers had in addition been formed, mainly in the Murree Hills. Special arrangements had been made for the supply of fresh milk to the sick in the hospital, and cows for this purpose had been placed so far at the front as Dakka, Bannu, and Tank. Scale of equipment of Indian general hospitals had been reviewed and arrangements for providing additional equipment were in progress.

NECESSITOUS LADIES' HOLIDAY FUND.—The war has reduced the income of many superannuated governesses, hospital nurses, literary ladies, companions, painters, musicians, actresses, and, indeed, all those disqualified from engaging in other lucrative work. A letter signed by the treasurer, Miss Constance Beerbohm, appeals for support in order to make a holiday possible for ladies unable to earn in the summer months. For those to whom a holiday is out of the question relief is supplied in the form of food, medicine, and clothing. The address of the treasurer is 48, Upper Berkeley-street, London, W. 1.

Medical News.

MEDICAL INSTRUMENTS FOR SERBIA: AN APPEAL.—The urgent need for every description of instrument and hospital equipment prompts this appeal to the medical profession. The Hon. Mrs. Haverfield is returning immediately to Serbia to dispense the Fund for Disabled Serbian Soldiers, and will be deeply grateful to any medical men who will send to her at 9, Ennismore Gardens, S.W., any material of the indicated description.

ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At a meeting of the Council of the Royal College of Surgeons on July 24th and of the Comitia of the Royal College of Physicians on July 31st Diplomas of M.R.C.S. and L.R.C.P. were respectively conferred upon 78 candidates (including 13 women) who have passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Board, and have complied with the necessary by-laws. The following are the names and medical schools of the successful candidates:—

William Stirk Adams and Robert Geoffrey Addenbrooke, Birmingham Univ.; Reginald John Allison, Manchester Univ.; James Collingwood Andrews, Cambridge Univ. and London Hosp.; Maurice Aronsohn, London; George Arthur Emmanuel Barnes, University College Hosp.; Cecil Bluett, L.M.S.S.A., Sydney Univ. and London Hosp.; Thomas George Doughty Bonar, Guy's; Hilda Crichton Bowser, B.Sc. Lond., and Sarah Aileen Florence Boyd-Mackay, Royal Free; William Edelsten Bracey, L.R.C.P. & S. Edin., Birmingham Univ.; Gerald Arthur Augustine Bradnack, Guy's; Ella Marianne Britten, St. George's; Anna Bridget Broman, Royal Free and St. Mary's; Harold Mallows Brown, Guy's; Nai Cheua and Benjamin Young Harper Christmas, Middlesex; Simeon Moses Cohen and Percival Charles Collyns St. Bart.'s; Alfred Innes Cox, L.D.S. Eng., Middlesex; Ursula Beatrice Cox, Royal Free and St. Mary's; Egbert Aubrey Lennox Crichlow, King's College Hosp.; Ignatius Joseph Cruchley, London; Herbert Ernest Cumming, M.D., C.M., McGill Univ.; George Lambert Cutts, L.D.S. Eng., Guy's; Jenner Conway Davies, Cambridge Univ. and St. Bart.'s; Henry Dryerre, Edinburgh Univ.; Clement Dunscombe, Cambridge Univ. and St. Bart.'s; Tyrrell George Evans, St. Bart.'s; Thomas Fernandez, Cambridge Univ. and Guy's Hosp.; Kathleen Field, St. Mary's; Frederic Lionel Fonseka, Ceylon Medical College and St. Mary's; Herman Meyer Gerson and Frederick John Good, London; Harold Hyman Goodman, Leeds Univ.; Dorothy Margaret Greig, Royal Free and St. Mary's; Oscar Stanley Hillman, Middlesex; Aga Mohamed Kazim, Madras and University College Hosp.; Herbert Wilfred Kerfoot, M.D., C.M. McGill, McGill Univ.; Vasant Ramji Khanolkar, B.Sc. Lond., University College Hosp.; Hyman Jacob Levy, St. Bart.'s; David Livingston, Durham Univ.; Eric Shaw Longton, Liverpool Univ.; Aziz Abd El Sayed Mansour, Charing Cross; Maurice Marcus, London; Alfred Marsh, Liverpool Univ.; Alfred Yaphet Massouda, Guy's; Kathleen Harding Matthews, St. Mary's; Charles Moffatt, Guy's; Vasant Ganesh Mohile, M.B., B.S. Bombay, Bombay Univ.; Frewen Moor, Cambridge Univ. and St. Thomas's; Farid Moroos, St. Mary's; John Edward Blackburn Morton, Oxford Univ. and King's College Hosp.; Vernon Arthur Newton, Birmingham Univ.; John Gough Nolan, Manchester Univ.; Arthur Gordon Ord, Guy's; Edwin Ronald Ormerod, Manchester Univ.; Arthur Arnold Osman, Guy's; Sigrid Letitia Sharpe Pearson, Royal Free; Geraint Arthur Pennant, Cardiff and Bristol Univ.; George Stuart Bain Philip, Charing Cross; Thomas Henry Algernon Pinniger, Bristol Univ.; Hugh Reid, Liverpool Univ.; Benn Roland Reynolds, Bristol Univ. and St. Bart.'s; Charles Herbert St. John, Guy's; Olive Ballance Sharp, Royal Free and St. Mary's; George John Sophianopoulos, St. Bart.'s; Frederick Gordon Spear, Cambridge Univ. and St. Thomas's; Mary Sylvia Stocks, Royal Free and St. Mary's; James Grant Strahan, M.B. Tor., Toronto Univ.; Sonia Straschun, St. Mary's; Stanley Roy Tattersall, St. Thomas's; Beriah Melbourne Gwynne Thomas, Cardiff and St. Bart.'s; Desmond Villiers Townshend, Birmingham Univ.; Alfred Basil Keith Watkins, London; Frederic Francis Wheeler, St. Mary's; Angus Hedley Whyte, Durham Univ.; and Gladys Mary Thurlow Williams, Birmingham Univ.

Diplomas in Public Health were also conferred upon the following 12 candidates (including one woman), viz.:—

L. D. Bailey, L.R.C.P., M.R.C.S., St. George's; M. Barker, L.R.C.P., M.R.C.S., King's College; C. D. Day, L.M.S.S.A. Lond., Cambridge Univ. and St. Bart.'s; H. Falk, L.R.C.P., M.R.C.S., M.B., B.C. Cantab., Cambridge Univ. and St. Thomas's; W. H. Grace, M.B., B.S. Lond., M.R.C.P., M.R.C.S., Guy's; M. J. Holmes, M.B., B.S. Melb., Melbourne Univ. and University College; T. Legge, L.R.C.P., M.R.C.S., University College; R. D. Passey, M.B., B.S. Lond., Guy's; Eva Louise Cairns Roberts, M.B., Ch.B. Manch., Manchester Univ. and King's College; W. L. Webb, M.B., B.S. Lond., L.R.C.P., M.R.C.S., Guy's; H. E. Whittingham, M.B., Ch.B. Glasg., Glasgow Univ. and University College; and J. P. Williams, L.R.C.P., M.R.C.S., St. Mary's and King's College.

THE ROYAL SOCIETY OF MEDICINE: A WAR SECTION.—The proposed new section for dealing with all questions affecting medicine and surgery in the Navy, the Army, and the Air Force, has been established under the name of "War Section." The officers and council elected are as follows:—

President.—Surg. Rear-Admiral Sir Robert Hill, K.C.M.G., C.B., C.V.O., R.N.

Vice-Presidents.—Navy: Surg.-Capt. P. W. Bassett-Smith, C.B., C.M.G., R.N. Army: Major-General S. Guise Moores, C.B., C.M.G., A.M.S. Air: Brig.-General Fell, C.M.G., R.A.F. India: Sir Havelock Charles, G.C.V.O. Naval and Military Auxiliary Services: Col. William Pasteur, C.B., C.M.G.

Honorary Secretaries.—Navy: Surg. Lieut.-Cmdr. H. B. Hill, R.N. Army: Col. Oliver Robinson, C.M.G., A.M.S. Air: Lieut.-Col. J. McIntyre, M.C., R.A.F.

Representative on Editorial Committee.—Col. S. L. Cummins, C.M.G., A.M.S.

Representative on Library Committee.—Surg.-Capt. P. W. Bassett-Smith, C.B., C.M.G., R.N.

Other Members of Council.—Navy: Surg.-Cmdr. R. Bankart, C.V.O., R.N.; Surg.-Cmdr. R. A. Ross, R.N. Army (Regular): Col. E. M. Pilcher, C.B., C.M.G., A.M.S.; Col. Sir Edward Worthington, K.C.V.O., C.B., C.M.G., R.A.M.C. (Special Reserve): Capt. C. Max Page, D.S.O., R.A.M.C. (S.R.). Air Force: Lieut.-Col. Henry Cooper, D.S.O.; Major A. P. Bowdler. Naval and Military Auxiliary Services: Major E. B. Waggett, D.S.O., R.A.M.C. (T.F.). India: Lieut.-Col. C. Tilson Hudson, C.M.G., I.M.S. (ret.); Col. G. Irvine, C.B., I.M.S. (ret.). Canada: Col. H. A. Chisholm, C.A.M.C. Australia: Lieut.-Col. J. H. Anderson, A.I.F. New Zealand: Lieut.-Col. Bernard Myers, C.M.G., N.Z.E.F. South Africa: Col. P. G. Stock, S.A.M.C. Colonial Office: Dr. A. E. Horn.

These will serve until Sept. 30th, 1920. The first meeting of the section will be held on Monday, Nov. 10th, at 5.30, when a paper will be read by the President of the Section, and it is hoped that the opening meeting will be well attended. Members, of course, are at liberty to introduce friends.

Medical Diary for the ensuing Week.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c

LONDON HOSPITAL MEDICAL COLLEGE, in the Clinical Theatre of the Hospital.

A Special Course of Instruction in the Surgical Dyspepsias will be given by Mr. A. J. Walton:—

MONDAY, August 11th.—1 P.M., Lecture III.:—Dr. G. Scott: Radiological Examination of Upper Abdominal Lesions. Value of Opaque Meals.

FRIDAY.—4.30 P.M., Lecture IV.:—Dr. Panton: Test Meals. Technique for Acidity. Value of Results. Technique for Motor Power. Examination of Fæces.

A Course of Clinical Lectures for Advanced Students on Intermittent Blood Infections and their Relation to Certain Common Diseases of the Kidney, Prostate, Testicle, and other Organs will be delivered by Mr. F. Kidd:—

WEDNESDAY.—4.15 P.M., Lecture II.:—Hæmatogenous Infections of the Prostate. Clinical Course; Diagnosis; Treatment.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

COOMBS, H. M. McC., M.R.C.S., L.R.C.P. Lond., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Bedford District of the county of Bedford.

LIGHTBODY, J. H., M.D. Vict., Permanent School Medical Inspector for the Honiton District under the Devon County Council.

RAEBURN, J. A., M.D., Ch.B. Edin., D.P.H., to take Charge of the Whole System of Anti-tubercular Institutions Organised for the City of Hull.

ROY, D. W., M.B., B.C. Cantab., Assistant Obstetric Physician to St. George's Hospital.

SIMMINS, A. G., M.B. Lond., L.R.C.P., Medical Registrar to Westminster Hospital.

WOODMAN, M., M.S. Lond., F.R.C.S. Eng., Honorary Aural Surgeon and Laryngologist, General Hospital, Birmingham.

Royal Free Hospital: BLAKE, Miss ALDRICH, M.S. Lond., Consulting Surgeon, with Care of Patients; DAVIS, H., M.B. Oxon., F.R.C.S., Dermatologist.

Salford Royal Hospital: JEFFERSON, G., M.S., M.B. Lond., Honorary Assistant Surgeon; WHITE, H. V., M.D., Ch.B. Manch., Honorary Ophthalmic Surgeon; SMALLEY, A. A., M.B., Ch.B. Vict., Honorary Surgeon for Diseases of the Ear, Nose, and Throat.

Vacancies.

For further information refer to the advertisement columns.

Adelaide University.—Prof. of Path. and Bact. £900.
Antrim County Council.—Chief Tuberc. M.O. £600.
Bath City Council.—M.O.H. and Sch. M.O. £700.
Benenden, Kent, National Sanatorium.—Asst. Med. Supt. £175.
Birkenhead County Borough.—Asst. M.O.H. and Clin. Tuberc. O. £500.
Birmingham City.—Municipal Bacteriologist. £700.
Birmingham General Hospital.—Two Assist. S.'s. £50.
Birmingham Municipal Antituberculosis Centre.—Sen. Asst. Tuberc. O. £600.
Birmingham, Rubery Hill Asylum and Annexe at Hollymoor.—Med. Supt. £1250.
Bradford Royal Infirmary.—Res. Surg. O. £250.
Brighton Education Committee.—Sen. Sch. Doctor. £600.
Brighton, Royal Sussex County Hospital.—Sen. H.S. £140.
Caerleon, Mon., Newport Royal Infirmary.—Asst. M.O. £300.

Cairo, Egyptian Government School of Medicine.—Professors and Lecturers, £E.1000 and £E.600. Also Radiologist and Lect. in Radiology, £E.500, Anæsthetist and Lect. in Anæsthetics, £E.500, and Registrar and Tutor, £E.600.
Carmarthen Mental Hospital.—Second Asst. M.O. £250.
Charthom, near Canterbury, Kent County Asylum.—Jun. Asst. M.O. £300.
Chesterfield and North Derbyshire Royal Hospital.—Res. Surg. O. £350. Also Jun. H.S. £250.
City of London Maternity Hospital, City-road, E.C.—Surg. for Venereal Diseases. Also Physician, Child Welfare Department.
Croydon County Borough.—M.O. £400.
Derby, County Borough Education Committee.—Asst. Sch. M.O. £500.
Derbyshire Royal Infirmary.—Oph. H.S. £200.
Devonport, Royal Albert Hospital.—Res. H.S. £200.
Durham County Council. Asst. Welfare M.O. £500. Also District Tubere. M.O.'s. £600.
East Ham County Borough Education Committee.—School Dentist. £400.
East London Hospital for Children, Shadwell, E.—Cas. O. £120.
Eccles and Patricroft Hospital.—Res. H.S. £200.
Exeter City.—Asst. M.O.H. and Asst. Sch. M.O. £400.
George Town Municipality, Penang, Straits Settlements.—Asst. M.O.H. $4200.
Glamorgan County Asylum, Bridgend.—Fourth Asst. M.O. £400.
Greenwich Union Infirmary, East Greenwich, S.E.—Dep. Med. Supt. £400.
Hong Kong Government.—Bact. and Path. £600.
Huddersfield, Bradley Wood Sanatorium for Pulmonary and Surgical Tuberculosis.—Res. M.O. £500.
Khartoum, Wellcome Tropical Research Laboratories.—Asst. Bacteriologist. £E.600.
Leeds Public Dispensary, North-street.—Res. M.O. £200.
Liverpool, David Lewis Northern Hospital.—Three S.'s and Two P.'s. £150.
Liverpool Hospital for Consumption, &c.—Hon. M.O.'s.
Liverpool School of Tropical Medicine.—Tropical Research, Brazil. £300.
Liverpool, West Derby Union—Asst. Res. M.O. £393.
London University.—William Julius Mickle Fellowship. £200.
Maidstone, West Kent General Hospital.—Jun. H.S. £125.
Manchester Royal Infirmary.—H.S.'s. £25 for first six months, £50 for second six months.
Manchester, St. Mary's Hospitals for Women and Children.—Res. Obst. S. Also Res. Surg. O. £250.
Newark Hospital and Dispensary.—Res. H.S.
Newcastle-upon-Tyne, Hospital for Sick Children.—Sen. Res. M.O. £200.
Newcastle-upon-Tyne, University of Durham College of Medicine.—Demonstrators of Anatomy and Physiology. £350 to £500 and £300.
Norfolk Education Committee.—Sen. Asst. Sch. M.O. £500.
Northampton County Borough Education Committee.—Female Asst. School M.O. £350.
Nottingham, Notts Education Committee.—Asst. School M.O. £425.
Peckham House, 112, Peckham-road, S.E.—Sen. Asst. M.O. £400.
Putney Hospital, S.W.—Res. M.O. £150.
Queen Mary's Hospital for the East End, Stratford, E.—H.S.
Rochdale Infirmary and Dispensary.—Sen. H.S. £200.
Royal Chest Hospital, City-road, E.C.—Res. M.O. £200.
Royal College of Surgeons in Ireland.—Sen. Asst. (Anatomy).
St. Bartholomew's Hospital.—Phy., Surg., Asst. Surg., and Asst. Phy.-Accoucheur.
St. George's Hospital, S.W.—Two Cas. Officers. £100.
St. Mary's Hospital for Women and Children, Plaistow, E.—Dent. S. £50.
Salford Royal Hospital.—Hon. P. and Hon. Asst. P.
Sheffield Royal Infirmary.—H.S. £150.
Swansea General and Eye Hospital.—Res. M.O. £200.
Taunton and Somerset Hospital.—Res. Asst. H.S. £80.
Torquay Education Authority.—Asst. Sch. M.O. and Dept. M.O.H. £350.
University College Hospital, Gower-street, W.C.—Asst. S.
West African Medical Staff.—Number of appointments. £400.
Willesden Urban District Council.—Asst. M.O.s. £550 to £650.
Wolverhampton and Staffordshire General Hospital.—M.O. for Venereal Clinic. £800.
Yorks, West Riding County Council.—District Tubere. O.'s. £500.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of a vacancy for Certifying Surgeons under the Factory and Workshop Acts at Thorne.

Births, Marriages, and Deaths.

BIRTHS.

CARLISLE.—On August 1st, at "Ardlair," Heswall, Cheshire, the wife of Captain H. G. Carlisle, R.A.M.C., of a daughter.
MACCALLAN.—On July 30th, at Mandeville-place, W., the wife of Arthur Ferguson MacCallan, F.R.C.S., of a daughter.

MARRIAGES.

ELLIOT—GREENE.—On July 31st, at St. Margaret's, Westminster, Lieutenant-Colonel Henry Charles S. Elliot, O.B.E., C.A.M.C., to Margaret Kathleen Mary, daughter of the late Charles Temple Greene.
GREENISH—WRIGHT.—On July 29th, at All Saints Church, Warlingham, Surrey, F. Harold S. Greenish, M.A., M.R.C.S., L.R.C.P., to Edith Marjorie, only daughter of Mr. and Mrs. Duncan Wright, of "Sidbury," Warlingham.

DEATHS.

BURRELL.—On July 30th, at Kew Gardens-road, Kew, Lionel Burrell, M.D., aged 80.
MATHEWS.—On August 1st, at College Court, Shrewsbury, Paul Mathews, M.D., aged 39.
WEEKES.—On July 31st, at Malvern, Francis Henry Weekes, F.R.C.S. Eng., M.D. Durh., aged 66.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

AN EMERGENCY CASES HOSPITAL IN THE MEUSE.[1]

BY J. A. CAIRNS FORSYTH, M.Sc., M.B., F.R.C.S.,
SURGEON TO THE FRENCH HOSPITAL.

OFFERED to, and accepted by the French Army, in December, 1914, our unit did not leave England until the following March, for the hospital was independent of any Red Cross organisation as regards funds, and it took some time before the means necessary to equip and maintain the formation for any length of time were obtained.

We went out with the intention of doing urgent surgery, but when we arrived at Bar-le-Duc, our destination, we found that for that class of work we were both unnecessary and unsuitable. We were a little disappointed at first, but we talked things over among ourselves, and decided that we could still do good work in the treatment of fractures, a department of surgery that was then making rapid progress.

Early Days in Bar-le-Duc.

At Bar-le-Duc we were given a wing of a caserne for our hospital, and it was easily adapted to our needs. The concrete barrack rooms made excellent wards, and I am afraid we scandalised the French by the open-air treatment that we gave our wounded.

We were fortunate in having for our surgeon-general the Médecin Inspecteur Mignon, a former director of the Val-de-Grâce. When the hospital was offered to the French Army as a whole General Mignon asked for it to be attached to his command, as he had a profound respect for English nursing. He was a man of deep human feeling, a great organiser, and, at the same time, a fine clinician. He quickly arranged that we should receive our wounded direct from the front, and advised the médecins chefs of the field hospitals to reserve the fracture cases for us. The system worked well. Whenever there was fighting in the Argonne we were informed at once, and our cars went up and brought down the wounded straight away.

We soon made friends with the staffs of the field ambulances, and they took great interest in our hospital, visiting it whenever they came to Bar-le-Duc. They were naturally rather envious of our fine equipment, for the French Medical Service is the Cinderella of all the Army Services. In order to be a successful médecin chef, you must have the gift of being able to make bricks without straw. Many of these men possessed that gift, and I have often been astounded at the ingenuity they displayed in making something out of nothing.

Visits to the Argonne Front.

One road along which we often travelled led us to Clermont. Clermont is built on a bluff in the Argonne, and must have been a very beautiful spot once, before it was burned out by the Germans. Its staircase street is rather quaint, winding up the side of the bluff to the church, which has been quite destroyed.

The local hospital fortunately was saved from destruction by the energies of a very brave nun, the Sister Gabrielle. She drove out the Germans when they entered the building to set it on fire, and rumour had it that she even had a few words of wisdom for the Crown Prince.

From Clermont, the Paris-Metz road ran west to east, and along this road were the towns and villages of Dombasle, Les Islettes, Ste. Menehould, and Braux Ste. Cohiere. In each of these were field hospitals, and at Braux there was one of the first motor hospitals, or "auto-chirs," as they were called, costly formations, but very mobile. Beyond this line were the smaller advanced hospitals, scattered throughout the Argonne, for at this time the French were doing a deal of urgent surgery close to the lines, as the Argonne roads were very bad. In one village, which was only 800 yards from the lines, they had an advanced operating centre installed in two houses. Here I saw head cases, chest cases, and abdominal cases that had been operated on, lying on the straw and doing well.

The great majority of the wounds from the Argonne were produced by bombs. It was the era of the jam-tin bomb, the "tourterelle," the "crapouillot," the "minenwerfer," and such barbarous engines of trench warfare. Gas gangrene, on the whole, was not common, but we saw enough of it to be always on guard.

[1] An address given at the last Social Evening of the Royal Society of Medicine and here published in an abridged form.

The Real Frenchman.

By this time we had got to know our soldier patients very well, and had acquired the greatest respect for them. Most of us had gone to France with only the conception of French character such as one sees on the stage, and we were agreeably surprised to find that the French soldier was a totally different being, a really very great man. At heart a child, he resembled a child in that he could find his own amusement and required no entertaining. The poilus were very skilled in handicrafts, and excelled in metal work and woodwork, and as soon as they were strong enough and able to use their hands they took to fashioning things out of bits of aluminium and shell cases. With a few simple tools they turned out beautiful rings and automatic lighters. Later on, when we moved to Faux Miroir, they specialised in the making of walking-sticks.

At Colonel Hunter's lecture I referred to their personal cleanliness, and certainly it was remarkable how they managed to keep their bodies free from lice. My own opinion, if I may give it again, is that it was largely due to the fact that the French soldier is provided with a uniform that will wash and which he is made to wash, and, in addition, he wears cotton shirts and underclothing instead of woollen. He washes his body daily—there is no false modesty among the French soldiers on that point—and he does not require a bath for his ablutions. Whatever the reasons were, we found that parasitic diseases were conspicuous by their absence, and trench fever was unknown.

The Hospital at Faux Miroir.

In August, 1915, we were asked to move to Faux Miroir, a château near Revigny, nine miles to the west of Bar-le-Duc. Now this château of Faux Miroir, which, by the way, was more like a Swiss hotel than a château, proved to be an interesting place, for it had been a German ambulance for two days during the battle of the Marne. The verandah had served as the operating theatre, and limbs, as they were amputated, were simply thrown over the parapet into the little plantation adjoining. The château was frequently visited by the Crown Prince during the battle, as there was a staff headquarters in the laundry. In a flower bed in front of the verandah was the grave of Hauptmann von G——, one of the Crown Prince's intimate friends, who was mortally wounded at the gate of the château and died in the salon.

All round Faux Miroir were signs of the fighting at the Marne. Three parallel rows of trenches crossed the park immediately in front of the château. In the fields, woods, and by the roadsides were many graves. Revigny itself, 3 kilometres away, on the railway from Paris to Nancy, had been much destroyed, partly by shells, partly by paraffin, for the Germans, before they retreated, set the town on fire. The Crown Prince is said to have viewed the bombardment and burning of Revigny from a dug-out at Villers-aux-Vents. It was a very palatial dug-out, for it was lined with fine old oak doors taken from the neighbouring cottages.

Close to the château, in the lee of a small wood, we built our hospital. It was hard work, as we were on 60 feet of clay, but by putting down over 200 tons of stones, slag, and gravel we made the surface sufficiently porous and dry to withstand the damp of the Meuse winters. The wards were the usual Bessanot huts, double walled, with swinging side partitions that opened outwards, so that there was abundance of air in warm weather. Each of the six wards accommodated 20 patients. The private chapel made an excellent operating theatre, as it was well lit and easily cleaned. The sacristy adjoining was converted into a preparation and sterilising room. We soon got the local ironmonger quite enthusiastic in the making of Blake splints, and we were able to employ them during that autumn and winter and find out their many advantages.

Life at Faux Miroir was much more pleasant than at Bar-le-Duc, and the change from town to country was greatly appreciated by both patients and staff. We had 600 acres of wood and park where the convalescents could roam about, and we gave them plenty of liberty, which I am proud to say they never abused. The winters were very severe, and for weeks the whole country lay deep in snow. Transport of the wounded to and from the station was then very difficult, as a high and steep hill lay between us and Revigny. In our off times during the winter we hunted the mighty boar that came down in bands from the Argonne. The larger ones we shot and ate with great relish, the little ones we tried to catch alive with the dogs, as they made most lovable pets.

(To be concluded.)

THE PNEUMAMETER.

DESCRIBED as a new portable spirometer, this apparatus is simple enough in detail, and after a little practice the results obtained appear concordant and relatively instructive. The principle is that of the diving bell with a small escape at the top, the bell being kept poised by the expired air of the operator, and releasing a scale which descends uniformly by its own weight and registers the duration of expiration and therewith its actual volume on an empirical scale. To use the apparatus water is placed in the outer cylinder, the inner cylinder being removed for that purpose. The inner cylinder is then replaced, the scale which passes through an aperture at the top being brought upwards to the zero mark. A pair of levers each side of the scale keeps it in position and these are released as soon as the pressure of expired air raises the cylinder. When the operator can no longer maintain the expiratory pressure the inner cylinder falls and the descending scale is caught by the pointers or levers and held there when the reading can be taken. The breath enters by a pipe in the outer cylinder bent upwards and projecting into the inner cylinder. A rubber tube is attached with a glass mouthpiece, so designed as to prevent condensed water from the expired air reaching the mouth again. The glass mouthpiece, of course, can be sterilised.

The instrument was submitted to us by the Oliver-Pell Electric and Manufacturing Co., Ltd., of Granville House, Arundel-street, London, W.C. 2.

SMALL HOLDINGS AND THE RETURNED SOLDIER.

A NEW addition to the excellent series of guide books for ex-Service men and others, some of which we noticed in THE LANCET of May 24th, p. 922, has just been made by the Board of Agriculture and Fisheries—namely, "Dairy Farming Under Small Holding Conditions." In it the choice and management of a holding, the relative advantages of milk-selling, cheese-making, and butter-making are discussed, together with methods of production. The pamphlet can be obtained for 2*d.*, post free, by the general public, and by ex-Service men free of charge and post free, from 3, St. James's-square, S.W. 1. The Board of Agriculture and Fisheries have also issued a pamphlet, which can be obtained post free from the same address, on "Apple Aphides." This is an abridgment of an article which recently appeared in the *Journal of the Board of Agriculture* from the pen of Mr. F. V. Theobald and deals with the life histories and the methods of destruction of some of the aphides which infest apple trees.

AN IMPROVEMENT IN THE GALVANOSET APPARATUS.

AN improvement of some importance in the rheostat, known as the Galvanoset, is announced by the Medical Supply Association of 167-185, Gray's Inn-road, London, W.C. 1. The four conducting elements were formerly made of carbon, but the positive element of this material tended to crumble and discolour the water, which necessitated frequent changing of the water and replacing the carbon. This disadvantage is entirely removed by adopting a positive element of platinum. The improvement is an obvious one, and those who have been using the Galvanoset apparatus may be glad to know that this change can readily be made, and what was a source of inconvenience can be avoided by this simple adjustment.

Communications, Letters, &c., to the Editor have been received from—

A.—Agricultural Costings Committee; Mrs. V. B. Alvarez, New York; Sir R. Armstrong-Jones, Lond.

B.—Dr. E. A. Barton, Lond.; Mr. J. S. Buckle, Lond.; Dr. J. Blomfield, O.B.E.; Mr. W. G. Ball, Lond.; Board of Agriculture and Fisheries, Lond.; Dr. G. Bousfield, Lond.; Dr. N. Bradly, Crowborough; Mr. W. E. Brown, Uxbridge; Mr. J. B. Burke, Kingston Hill.

C.—Colonial Office, Lond.; Dr. A. Carver, Birmingham; Dr. T. F. Cotton, Lond.

D.—Mr. J. D. Driberg, Lond.; Capt. R. Datta, I.M.S.

E.—Dr. R. Eager, Exminster.

F.—Dr. W. G. Forde, Cloyne; Dr. R. F. Fox, Eynham; Pte. W. Foss, R.A.M.C.; Factories, Chief Inspector of, Lond.

G.—Dr. H. L. Gordon, Lond.; Dr. W. E. Gye, Lond.

H.—Capt. J. K. Haworth, R.A.M.C. (S.R.)

J.—Dr. T. H. Jamieson, Lond.; Prof. F. Wood Jones, Lond.

K.—Dr. L. J. Kidd, Lond.; King's College Hospital Medical School, Lond., Sec. of; Lieut.-Col. J. W. Kynaston, R.A.M.C.

L.—Dr. R. B. Low, Lond.; Dr. O. Langmead, Lond.; Dr. H. A. Lediard, Carlisle; Dr. E. G. Little, Lond.; Mr. J. H. Lloyd, Leighton.

M.—Ministry of Health, Lond.; Capt. H. C. Martin, R.A.M.C.; Mr. W. V. McNae, Lond.; Dr. A. Mary, Paris; Dr. B. Moore, Lond.; Mr. J. Y. W. MacAlister, Lond.; Dr. C. S. Myers, Cambridge; Mr. E. Mulligan, Swinford; Messrs. Masson et Cie, Paris.

N.—National Council for the Unmarried Mother and her Child, Lond.

P.—Dr. S. Porterfield, Widnes; Major J. Porter, R.A.M.C.

R.—Dr. W. C. Rivers, Alton; Royal Society of Medicine, Lond.; Royal Sanitary Institute, Lond.

S.—Dr. A. G. Shera, Eastbourne; Salford Royal Hospital, General Supt. and Sec. of; Prof. W. Stirling, Manchester; Mr. E. S. Servetopoulos, Cairo; Mr. F. B. Shawe.

T.—Dr. H. H. Tooth, C.B., C.M.G., Lond.; Territorial Force Medical Officers Association, Lond., Hon. Sec. of.

W.—Dr. C. Walker, Birmingham; Dr. F. J. Wethered, Falmouth; Dr. L. A. Weatherly, Bournemouth; Mr. M. Woodman, Birmingham.

Communications relating to editorial business should be addressed exclusively to the Editor of THE LANCET, 423, Strand, London, W.C. 2.